THE RENEWAL OF TRUST IN RESIDENTIAL CONSTRUCTION

PART II

VOLUME TWO

(Preliminary)

COMMISSION OF INQUIRY INTO THE QUALITY OF CONDOMINIUM CONSTRUCTION IN BRITISH COLUMBIA

Submitted to

The Lieutenant-Governor in Council

Government of British Columbia

by

Dave Barrett, *Commissioner*

March 2000

This report has been edited of references to those matters that are currently the subject of review by police authorities.

March 9, 2000

The Honourable Jan Pullinger
Minister of Social Development and Economic Security
Parliament Buildings
Victoria, BC
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Dear Ms. Pullinger,

On August 11, 1999, this Commission was re-appointed to inquire into the quality of condominium construction in British Columbia; the financial failure of New Home Warranty of British Columbia Inc.; and the impacts on homeowners, the industry, and the economy because of this situation. The Commission was to make recommendations for necessary changes in legislation, regulations, and administrative practices by October 15, 1999.

Unfortunately, the Commission met with resistance from the New Home Warranty Board of Directors and former executive staff, rendering it impossible to meet this deadline, or the subsequent deadline of January 15, 2000.

On January 31, 2000, I submitted to your predecessor, Volume I of the Commission's work which relates to homeowners and the urgent need for financial support to meet the costs associated with this unfortunate disaster. The scope and magnitude of the problem and the need to address the plight of these unfortunate victims, necessitated the immediate submission of the Commission's findings pertaining to financial compensation.

This volume includes all other matters not addressed in Volume I, including the causes of the failure of New Home Warranty, and is now submitted for your consideration. Because of the importance of the issues addressed in this report, we have provided relevant documents as Volume III, Part A and B.

Yours truly,

Dave Barrett
Commissioner

The Renewal of Trust in Residential Construction
Part II : Volume II

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TERMS OF REFERENCE

1. To further inquire into the quality of condominium construction in British Columbia, in particular, the adequacy of protection for, and accountability to, consumers for faulty condominium construction.

2. To inquire into the impact on homeowners, the housing market, mortgage insurers and the economy of the financial failure of New Home Warranty of British Columbia, Inc., and to inquire into the history of home warranties in BC and the causes of the failure of New Home Warranty of British Columbia, Inc.

3. To inquire into the extent of foreclosures, bankruptcies, and related matters arising from faulty condominium construction.

4. To submit a report by March 10, 2000 to the Lieutenant Governor in Council through the Minister of Social Development and Economic Security, recommending any measures, including but not limited to changes to legislation, regulations or administrative practice, that the Commissioner determines are needed.

The Commission's original reporting date was October 15, 1999. This was subsequently changed to January 15, 2000, and finally to March 10, 2000. The Commission needed to undertake an extensive examination of NHW activities leading up to its failure, and question senior staff and Board members. Much of this work was delayed because of an unwillingness of some parties to participate in the hearing process.

During the Commission's work, a clarification in the terms of reference was sought and granted. This clarification led to the addition *of "and to inquire into the history of home warranties in BC and the causes of the failure of New Home Warranty of British Columbia, Inc."*

Acknowledgments

The Further Inquiry into the Quality of Condominium Construction in British Columbia required extensive demands on those involved. This important work could not have been completed without the support and assistance of the Commission's advisors and support staff.

The Commission is very appreciative of the extensive support provided by Legal Counsel Peter Leask, Q.C., and Economic and Financial Advisor, Robyn Allan, who so ably assisted the Commission during the first hearings. Both professionals brought to this Commission's work their extensive backgrounds and experience as well as an intense understanding of the issues involved.

Also, I would like to thank Dixie Pidgeon, Tim Woods, Tom Sinclair, Maggie Sanders, Janet Lazarowich, Rita Lalik, Khris Chen, Catherine Kottmeier, and John Popkin for their hard work and dedication.

Finally, I would like to express my appreciation to the hundreds of presenters who came forward at the Public Hearings, or who wrote submissions to the Commission. Homeowners who shared their experiences, or industry participants who provided their professional assistance and advice, have been invaluable to the Commission's work. I trust the analysis and recommendations in this report and, subsequently, in Volume II, will provide much needed assistance to homeowners so they can continue to pursue their hopes and dreams, and to the industry, so that it can function in a healthy and prosperous manner.

Additional copies of this report are available from:

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Executive Summary

On August 11, 1999, a further Commission of Inquiry into the Quality of Condominium Construction in British Columbia was appointed by the Minister of Social Development and Economic Security, to review the adequacy of protection for, and accountability to, consumers for faulty condominium construction.

The Commission was asked to inquire into the impact on homeowners, including the extent of foreclosures, bankruptcies, and related matters, and also the causes of the failure of New Home Warranty of British Columbia, Inc. The Commission, upon completion of its inquiry, was to recommend any legislative, regulatory, administrative, or other measures needed to ensure consumer protection and accountability for this situation.

The material presented in this report is a result of extensive public hearings, and numerous written submissions, received by the Commission from September 13, 1999 to February 21, 2000. In all, there were 53 sessions of public hearings held in Vancouver, Coquitlam, Richmond, Victoria, and Nanaimo. In total, there were 182 presenters and 340 submissions.

Presentations were made by condominium owners, strata council representatives, concerned individuals, groups involved in various public and private aspects of the industry, and professionals with expertise in related fields. The Commission also reviewed relevant existing legislation, public and private reports, and undertook various background research activities.

The Commission's report has been divided into two volumes. Volume I covers all aspects of consumer compensation, including the magnitude of the problem; review of recommendations contained in the first Barrett Commission report, as they relate to financial support for homeowners; and a recommendation for a Compensation Plan based on the findings of the recent hearings.

The testimony and submissions presented to the Commission clearly identify that the problem in residential construction is wide ranging and devastating, not just for those with limited means, on pension income, or involved in co-operative housing, but also for middle-income earners. The Commission has heard compelling testimony from a cross-section of British Columbians. This clearly suggests a crisis of unprecedented proportions. It is a disaster--the consequences of which are devastating and pervasive.

All other issues contained in the Commission's terms of reference are addressed in this volume including: New Home Warranty of British Columbia Inc., the Building Code, Industry, Government, and Health. Volume III is a compendium of documents relevant to Volume II.

Summary of Findings

2. The Building Code

The Commission's first report concluded that a number of factors, including a failure of the building process; building science issues; overheated housing market; and a poorly-interpreted building code, led to a disintegration in the quality of residential construction in BC. This judgment received widespread endorsement from the building industry, architects, engineers, inspectors, and the general public.

Numerous presenters, including strata council representatives with commissioned engineer studies, architects, engineers, and warranty providers, told the Commission of building envelope failures as a result of poor or inappropriate design and shoddy workmanship. Not one example was brought forward where such buildings had been built to code. Instead code violations were the reason for the failure of the buildings.

Within the industry there is confusion in understanding and interpreting what is required by building codes. There is also confusion and misunderstanding regarding the nature of the leaky condo problem. Although discussion surrounding air barriers, vapour barriers, permeance, and poly are all interesting, they are not relevant to the problems facing British Columbia's building envelope failures. Building envelopes are failing because litres of water are entering the walls from the outside through poorly-designed roofs, balconies, and windows; because of badly-constructed joints, missing flashings, inappropriately-lapped building paper, and thinly-applied stucco.

There has been no evidence that building envelopes, constructed according to the building code, will fail. The Commission is aware that some building envelope systems, certain design approaches, and combinations of materials are conducive to higher standards than others. However, according to the extensive testimony received from numerous professionals, if the Building Code is followed--with a requisite understanding of building science--the building envelope systems will work.

With respect to a call for a "Made-in-BC Code," BC and Vancouver had had their own codes for a least the period under review (1983 - 1999). In order to meet the needs of our unique climate, these codes are established through a building industry, participatory process.

Shortly after the Commission reconvened public hearings in September 1999, it was learned through media reports that Mr. James Currie, director of the Building Standards Branch until retiring in 1987, had written to the Provincial Minister of Municipal Affairs in 1991 outlining his concerns over the direction taken by the National Building Code with respect to house construction. As well, Mr. Currie had written to the National Research Council in 1987. On May 25, 1999, Mr. Currie wrote to the then Minister of Municipal Affairs, Jenny Kwan, referring to his past correspondence on the matter. The Commission has reviewed the issues raised by Mr. Currie and the process undertaken to respond to his concerns by the provincial and federal departments responsible from 1987 - 1999. The Commission has found that each of Mr. Currie's letters were investigated and analyzed by industry building and regulatory authorities at the provincial and federal levels.

Because of the general level of misunderstanding and confusion surrounding building code issues, and the fact that voluntary education and training is not occurring quickly enough to instill the ability necessary for sound building envelope design and construction, for both new and repair activity, the Commission recommends mandatory education, training, and examination of builders, architects, and engineers.

Therefore, the Commission recommends that The Homeowner Protection Office, with the support of the Provincial Advisory Council, provide the leadership for minimum mandatory education for multi-family residential design and construction. Such education to include the testing of architects, engineers, and registered builders, regarding the basics of building science and interpretation of the BC Building Code and Vancouver Building Bylaw.

3. The Industry

In analyzing the various sectors of the British Columbia residential construction industry--from builder/developers, architects, engineers, and the building labour force, the Commission reconfirms that there are many causes responsible for the systemic breakdown of the industry. In reviewing various developments since the first report, it is clear there has been a substantial improvement in the quality of residential construction. However, more action is required in a number of important areas, especially on subcontractor licensing, compulsory trades designation and enforcement, and the introduction of mandatory repair warranties. There were a number of recommendations from the first report dealing with these issues that need to be implemented.

The Reconstruction Fund has benefited financial institutions who hold first mortgages on condominiums with building envelope failure. Without the Reconstruction Fund, financial institutions would have suffered a cash flow loss, to date, of approximately $61 million and a real loss of close to $30.5 million. The Commission recognizes the financial institutions have not yet contributed to the solution of the leaky condo problems, and recommends that the provincial government bring in adjustments to the *Corporation Capital Tax Act* so that a dedicated revenue amount of $30 million ($10 million per year over three years) be obtained from financial institutions for financing the Research and Education activities of the HPO. It is further recommended that this fund be used as a capital fund and the interest earned each year be allocated to research and education as set forth by the Provincial Advisory Council.

The Commission, in a detailed review of Canada Mortgage and Housing Corporation (CMHC) and its role in this catastrophic disaster, has concluded that CMHC's public interest role has been seriously eroded as its commercial activities have advanced--especially in the area of consumer protection. This has been further aggravated by the unique relationship between CMHC and NHW, and a lack of stewardship by CMHC in ensuring that the home warranty company they mandated was a viable and prudent warranty company.

4. The Government

Widespread building envelope failures in British Columbia represent a catastrophic disaster, resulting in serious harm to the health, safety, and welfare of up to 50,000 families. The Commission urges the federal and provincial government to act on the recommendation contained in Volume I and implement the Compensation Plan.

Government structure should reflect the importance of residential construction to the economic health and well being of the province. Housing, as an area of public policy, has been neglected. All housing issues, including those related to leaky condos, would benefit from a clearer, more direct focus. The responsibility for housing issues has resided in a number of ministries, for at least the past decade, contributing to the confusion in the industry. Consistent with its recommendation in the first report, the Commission recommends the reinstatement of the Building Standards Branch. Further, the Commission recommends that the provincial government create a Housing Ministry responsible for BC Housing, housing policy, residential construction, the Homeowner Protection Office, Building Standards Branch, and the BC Building Code.

In addition, the Commission recognizes the need for ongoing stewardship of the industry's progress and recommends that a Legislative Select Standing Committee be established to conduct annual reviews, for the next five years, of all housing issues.

The Commission is concerned that municipal building inspection is not adequately monitoring Building Code compliance. Given the extensive number of code violations related to multi-family construction, it is vitally important that municipal officials play a much more significant role in

administering and enforcing the Code--this includes the need for a greater knowledge base for some officials when interpreting the Code.

Among the many issues and concerns raised over the current regulatory environment, related to the *Condominium Act* (soon to be the Strata Property Act) and the *Real Estate Act*, the Commission has concluded that there be conditional licensing of multi-family developer sales personnel, and that public disclosure documents intended for use in the sale of strata properties become mandatory. Furthermore, the HPO should establish a Condominium Homeowners Office to administer the Strata Property Act and provide services to condominium homeowners in an effort to redress the imbalance between developers and consumers, created in the market.

5. Health

Health issues related to mould and leaky condominiums are now coming into focus. The Commission has identified serious physical health consequences to many owners of leaky condo units whose exposure to mould growth has impacted their own health or that of their family members. Dealing with mould is a challenge, not only for condominium owners and their strata councils, but also for the construction industry, the remediation companies, construction workers, and governments at all levels.

The Commission has recommended that the Workers' Compensation Board increase the frequency of visits to condominium repair sites and implement amendments to relevant regulations dealing with the hazard assessment of biological contaminants.

Chapter ONE

Introduction

On June 16, 1998, the first report of the Commission of Inquiry into the Quality of Condominium Construction in British Columbia was submitted to the Lieutenant Governor in Council. This report included 82 recommendations, many of which were acted upon expeditiously, including the enactment of the *Homeowner Protection Act*; (HPA) mandatory builder registration; mandatory private-sector, competitive warranty; and the Provincial Reconstruction Loan Program.

The recommendations contained in the first report addressed numerous issues contributing to the crisis in residential construction in an effort to ensure that poor quality housing would never again be built, and that quality repairs would be undertaken for victims of this disaster. As well, recommendations were made to assist, in an equitable manner, those people who had suffered financially.

The Homeowner Protection Office (HPO) was approved in July 1998, and commenced operation October 1, 1998, under the authority of the HPA. In addition to the licensing and regulation of builders, and the administration of the Reconstruction Loan Program, the HPO, with assistance from the inter-industry Provincial Advisory Council (PAC), is responsible for developing an education, training, and research strategy necessary to meet the technology transfer required by this crisis.

Although the HPO has taken immediate steps toward implementing many of the recommendations of the first Commission's report, the regulation and licensing of sub-contractors and repair contractors, and mandatory warranty for repairs, are still outstanding. The status of outstanding recommendations, as well as implemented recommendations, are included throughout this report.

The first Commission's report included a number of recommendations to assist homeowners who had been financially impacted by this crisis. The recommendations required the support of the provincial, federal and, to a lesser extent, municipal governments. The development industry's contribution is a $750 levy on new construction. The provincial government responded positively. However, relatively little has been forthcoming in the way of support from the federal government. This lack of support has affected the financial stability of many homeowners--the effects of which are beginning to be felt throughout the entire economy.

On March 30, 1999, New Home Warranty of British Columbia, Inc., (NHW), a private-sector warranty company owned by the Canadian Home Builders Association of British Columbia (CHBA-BC), became insolvent. With 70,000 homeowners now without warranty protection--the majority of them owners of condominiums, the financial burden of this crisis intensified. The Commission had been assured during its first hearings that NHW would be able to meet the challenges of the leaky condo crisis through its reserves. However, with NHW's failure, the economic and financial consequences needed to be understood and addressed.

On August 11, 1999, the Commission of Inquiry was re-convened. Dave Barrett, former p.emier of the province, who conducted the first inquiry, was asked to conduct the second Commission. It's mandate was to inquire into the adequacy of protection for, and accountability to, homeowners for faulty condominium construction; the causes of the failure of NHW; and the financial, economic, and other costs related to this crisis in residential construction.

The Commission held hearings from September 13, 1999 to February 21, 2000. At the hearings, condominium owners--many who thought they were protected by NHW, and who are now in the early stages of the repair process, undergoing repairs, or facing bankruptcy and/or foreclosure--voiced their concerns. A broad cross-section of participants in the residential construction industry, as well as federal and provincial agencies and program representatives, also made presentations and answered the Commission's questions.

On November 8, 1999, the Commission issued to the Minister Responsible for Social Development and Economic Security, an urgent bulletin regarding the disclosure by builders of the warranty coverage provided on their newly constructed buildings. With the failure of NHW and the transition from a non-regulated to a regulated, mandatory warranty environment, consumers were confused. The Commission urged that all advertising related to the marketing of new residential construction clearly identify the scope of warranty coverage and whether the coverage offered met the minimum industry standard as required by the HPA.

On February 2, 2000, the Commission submitted Volume I of its report which focused on the magnitude of the problem and the need to provide compensation to homeowners facing repairs as a result of premature building envelope failure. Volume I was submitted in advance of this report because the impact of this crisis is severe and pervasive, resulting in conditions tantamount to a natural disaster. The Commission identified the indirect costs of this disaster and estimated them to be about two times greater than the direct repair costs of $1 billion estimated in its first report in 1998. This increased burden for all British Columbians is because of the failure of NHW, and the lack of action on outstanding financial support recommendations for homeowners.

Volume I included only one recommendation--*that the provincial government, with cost sharing provided by the federal government and the BC residential building industry, establish a Compensation Plan through the HPO. The Compensation Plan would provide a grant to homeowners for qualified building envelope repairs of up to $25,000, with cost sharing beyond this amount, to a maximum of $35,000.*

This report is being submitted as Volume II, of three volumes, and deals with the terms-of-reference items not included in Volume I. Volume III - Part A, B, and C, includes documents relevant to the findings in Volume II.

Chapter THREE

The Building Code

Building Codes clearly specify that water should not be present in building envelopes.

> *Exterior walls shall be protected with siding (cladding), including flashing, trim and other special purpose accessory pieces required for the siding (cladding) system being used, to restrict the entry of rain and snow into the wall assembly.*
>
> *National Building Code, Section 9.27.2.1, Required Cladding, 1975 - 1999*
> *1985 BC Building Code, Section 9.28.2.1.; (9.27.2.1 1992-1998 Code)*[28]

> *1) ...where a building component or assembly is exposed to precipitation, the component or assembly shall*
> *a) minimize ingress of precipitation into the component or assembly, and*
> *b) prevent ingress of precipitation into interior space.*
>
> *BC Building Code 5.6.1.1.(1) 1998*

> *Exterior wall cladding shall be so installed that it sheds water to prevent its entry into other components of the building assembly. Where there is a likelihood of some penetration, drainage shall be provided to take water to the outside.*
>
> *BC Building Code, Section 5.4.5.1. 1985 and 1992*

I. Introduction

> *...if a failure has been identified as being due to ingress of precipitation, then that building has not complied with the building code.....The building envelopes, as designed, would have failed almost regardless of where the buildings were built.*
>
> *- Adaire Chown, Senior Technical Advisor, NRC*
> *January 13, 2000*

Understanding is the first step toward a solution--toward creating a sound and sustainable residential construction industry. This chapter outlines building code issues by drawing on numerous presentations and submissions--including research reports and scientific evidence--received by the Commission. Recommendations for the future are also made.

Numerous presenters, including strata council representatives with commissioned engineer studies, architects, engineers, and warranty providers, told of building envelope failures as a result of poor or inappropriate design and shoddy workmanship. Not one example was brought forward

[28] The Commission recognizes that the list of cladding materials does not include stucco explicitly and recommends that this be added to the list of cladding materials in the BC Building Code for clarity.

where such buildings had been built to code. Instead, code violations were seen to be the reason for the failure of the buildings.

> *In front of me, here, is a 400-page report of a condominium project in New Westminster with a remediation of $8.5 million, and throughout it are documents signed by President and Director, Andre Molnar, Quayside Developments....In this 400-page document, the only blame of the building code that are alleged by the architects that did this analysis for the strata council, are 469 violations of the code are alleged. Not one mention of the actual code itself being at fault.*
>
> *- Chuck Puckmayr, Concerned Citizen*
> *October 14, 1999*

In its first report (pages 18 - 26), the Commission extensively discussed the Building Code and its role in the construction performance of residential buildings--both single and multi-family.

The BC Building Code and Vancouver Building Bylaw are based on the National Building Code (NBC)--a voluntary document for application by provincial authorities. The NBC is intended to be used as a model code in order to create a relatively uniform set of building standards nation-wide. As outlined in the *Constitution Act*, building regulation is a provincial responsibility, and the BC Building Code is a provincial document applied throughout the province, except for the City of Vancouver. Vancouver has its own building code--the Vancouver Building Bylaw. Therefore, we not only have a "Made-in-BC Code," we also have a "Made-in-Vancouver Code."[29]

In the first Barrett Commission report it was stated that:

> *The Provincial Code is intended to represent minimum standards regarding life safety, health, and structural sufficiency of buildings. It is neither a textbook on building design, nor a criterion for quality or workmanship.*
>
> *- Barrett Commission, 1998, page 19*

Following numerous presentations and submissions from professionals, building officials, contractors, and building organizations, including UDI and the CHBA-BC:

> *The Commission was unable to find evidence that the building code, per se, has caused the problems. It agrees that the BC Building Code outlines appropriate performance standards for large buildings, as well as prescriptive standards for smaller buildings and homes. Where the building code may have failed is in the definitions of large and small buildings. This has resulted in a number of large, complex, wood-frame condominiums being built under the guidelines for smaller*

[29] Up until the adoption of the 1998 BC Building Code and the Vancouver Building Bylaw, the difference between the two codes was inconsequential, particularly as they relate to residential building envelopes. The 1998 codes were adopted subsequent to the first Barrett Commission report which called for as much similarity in the two codes as the authorities could accept. The differences between the two new codes, particularly with respect to face seal and rain screen, makes a distinction between them necessary in this report.

buildings. ***However, even under the prescriptive approach, the buildings should have been well constructed.***

- Barrett Commission, 1998, page 20

It was clear during the first set of hearings, as well as the recent ones, that there is confusion within the building industry in understanding and interpreting what is required by building codes. There is also confusion and misunderstanding regarding the nature of the leaky condo problem. Although discussion surrounding air barriers, vapour barriers, permeance, and poly are all interesting, they are not relevant to the problems facing British Columbia's building envelope failures. Building envelopes are failing because litres of water are entering the walls from the outside through poorly designed roofs, balconies, and windows; because of badly constructed joints, missing flashings, inappropriately lapped building paper, and thinly-applied stucco.

Diffusion is transfer of moisture in humid air to drier air, there is no air movement. Diffusion is measured in nanograms, that is 1 billionth of a gram, every second, mind you, but it's still a very small quantity. Rainwater is measured in litres.

- Pierre Gallant, Engineer
November 1, 1999

It is very important to understand the distinction identified in Mr. Gallant's testimony, as was identified in the testimony of other engineers, architects, and technical experts. The problem we are facing in British Columbia is due to wind-driven rain entering the building envelope through major design and/or construction flaws, and remaining in the envelope to such an extent that the building integrity is compromised. Whereas diffusion deals with nanograms, and air flow deals with grams, the water penetration problems of leaky condos involves litres. Litres of water should not be entering building envelopes. The issue we need to deal with is why these buildings are leaking, not with the rates of drying.

There has been no evidence that building envelopes, constructed according to the building code, will fail. The Commission is aware that some building envelope systems, certain design approaches, and combinations of materials are conducive to higher standards than others. However, according to the extensive testimony received from numerous professionals, if the Building Code is followed, with a requisite understanding of building science, the building envelope systems will work.

On January 6, 2000, Mr. Pierre Busque, Engineer, presenting on behalf of UDI, with assistance from Dr. Achilles Karagiozis, and Dr. John Straube, showed computer-modeled test results regarding vapour diffusion. It was suggested that if walls are wet when they are installed, they may have more difficulty performing well in BC than elsewhere. However, Section 9.3.2.5 of the BC Building Code is very clear that wood should not be wet when installed.

Ms. Allan: *If you knew what you were doing with the code in 1985 and 1992, there was nothing prohibiting you from building wall assemblies properly?*
Mr. Busque: *With part 5, totally agreed.*

Ms. Allan: *With respect to part 9?*
Mr. Busque: *....If the materials were dry at the beginning of construction, then the wall would have worked, even under part 9, yes.*
Ms. Allan: *And in fact, to meet the 19-percent [moisture] requirement of the code, you would want to make sure that when you put the wood in, it was dry or had been drying properly?*
Mr. Busque: *That's correct. The only problem that I see is that when we build a building...it can get wetter during the construction process, and if there's a rush to apply the inside vapour barrier before the wood is dry, then you're sealing that moisture in.*
Ms. Allan: *Now does the code restrict the pouring of concrete when its raining?*
Mr. Busque: *....I don't know. I don't think so.*
Ms. Allan: *....one would expect wood practice could be just as prudent, to not put walls in when it's raining?*
Mr. Busque: *Absolutely.*

The knowledge of how to construct buildings that are reasonably dry is already known. Developers need to start with that understanding.

The Commission believes that it is the developer who should ensure that a qualified construction team is hired to undertake the work--including architects, engineers, construction site superintendents, and on-site workers. All construction-related staff--from the design team to the construction crew--must understand how to use the Code, vis-à-vis their role and responsibility.

The architect's responsibility is to ensure proper design and implementation of design details on site. Engineers are to ensure the building science is appropriate for the exposure. Both professionals are required to understand and appropriately interpret the Code. The municipal inspector's responsibility is to approve plans for permit purposes and undertake on-site inspections to ensure the Code is not violated. Developers should see the benefit of building to Code and having on-site inspections as mitigating their future liability. On-site staff must be qualified to undertake their work in a way that maintains quality building standards and practices. For example, qualified electricians, as part of their training, are not only taught electricity, they are taught how to use the Code as the rule book for the minimum standards. Why should we not expect the same standards from construction workers?

The Commission is aware that the residential construction process failed in numerous situations. The Commission recognizes that education--the transfer of building science knowledge--is the key to ensuring these failures do not happen in the future. Recommendations were made in the first report to address this lack of skill and decision-making ability. Further recommendations will be made in this report, subsequent to a detailed review of code issues below. The Commission is hopeful that the Provincial Advisory Council of the HPO, and a reinstated Buildings Standard Branch, will satisfactorily address the need for reviewing issues and effectively coordinating understanding to assist the industry in carrying out its role and responsibility.

Ms. Allan: *So in your opinion, is the building code the problem?*
Mr. Cressey: *Point blank, is the building code the problem? My personal opinion? No.*
Ms. Allan: *...in fact, would you say it's the interpretation of the building code?*
Mr. Genest: *...it's the interpretation of the building code. With each municipality having a different interpretation of that code...we're trying to deal with fire issues, or we're trying to deal with seismic issues, which all may relate to the building envelope, but there's not a coordinating factor to bring all of that together.*

Scott Cressey, Rick Genest, Olga Ilich, Maureen Enser, UDI
November 1, 1999

II. Commission I - Recommendations

The Commission recognized, in its 1998 report, that steps needed to be taken to improve the interpretation and application of the BC Building Code and the Vancouver Building Bylaw, as well as the process for determining code content. The recommendations from the first Commission's report (#7 - #16) are provided below for review, with comments regarding the current status of their implementation.

> ***Recommendation #7: All Part 5 (Wind, Water, and Vapour) requirements of the BC Building Code be applied to all multi-unit, residential buildings, greater than two stories in building height, or larger than 600 square metres in building area (regardless of fire walls).***

The 1998 BC Building Code was adopted without this requirement. The Commission still has concerns that complex, multi-family buildings are being constructed under Part 9 (prescriptive), which is less clear about the standards of care and attention that exist in Part 5. As a result, due care and attention to quality can be overshadowed by other considerations. Part 5 requirements clearly confer on the builder, architect, and engineer greater standards than those in Part 9. It is also important--if Part 5 is going to become the standard, but that Part 9 can still be employed by the designer--that proper professional accreditation also be applied to the building process. Therefore, the Commission recommends the following revised recommendation #7.

> ***Recommendation #7 (revised): Part 5, with the associated professional design and review criteria, be applicable to all residential buildings greater than 2 stories in building height, located in geographic regions susceptible to wind driven rain, with such regions to be defined by the Provincial Advisory Council.***

The Commission is aware that the City of Vancouver Building Bylaw requires that any multi-family building greater than two units be constructed under Part 5. However, recognizing that such a requirement may be unnecessarily onerous on industry participants, the above definition is suggested.

Recommendation #8: All multi-family buildings facing renovations to the building envelope be renovated under the provisions of Part 5 of the BC Building Code.

In general terms, the essence of the Code is such that if alterations are being undertaken, such alterations must be in compliance with the existing code. Therefore, Recommendation #7 (revised), would apply to building envelope repairs.[30]

Recommendation #9: That the Vancouver Building By-law be reviewed with respect to applying Part 5 requirements to buildings, and to renovations for building envelope failures, to all multi-family residential buildings greater than two stories in building height or larger than 600 square metres in building area (regardless of fire walls).

The City of Vancouver applies Part 5 to buildings greater than two-family dwellings, taking the above recommendation a step further than the Commission originally suggested. The Commission commends the City of Vancouver for taking the lead in this regard but urges the provincial code development process to carefully consider adopting Recommendation #7 (revised).

Recommendation #11: That the Education and Research initiative be charged with the responsibility for:

- ***i) research and development of best building practices and techniques;***
- ***ii) ensuring that the advances in building science technology are clearly identified, agreed to, and disseminated to all parties responsible for design and construction of residential buildings;***
- ***iii) the approval of the designation requirements for Building Envelope Specialists prior to the endorsement of this specialty;***
- ***iv) the review, interpretation, and recommendations regarding the building code; and***
- ***v) assist in the development of key issues related to the residential construction market.***

The *Homeowner Protection Act* (Section 12) provides for the above, except for explicit approval of the designation of Building Envelope Specialists in (iii). Currently, the Association of Professional Engineers and Geoscientists of BC (APEGBC) and the Architectural Institute of BC (AIBC) have a Building Envelope Professional (BEP) designation which excludes anyone except an architect or engineer from the designation (the terms "professional" and "specialist" appear to be used interchangeably at this point in the development of these professionals).

The Commission sees some limitations in the minimal field exposure offered in the training program and the exclusion from the designation of other technicians with extensive training and experience. The Commission suggests the BEP, as it currently exists, is only a step towards the

[30] In an effort to remove all confusion regarding this point, it may be advisable to amend the definition of "alteration" in Part 1.1.3.2 of the Code to include "renovations, remediation, and/or repairs."

training and education necessary to ensure the transfer of knowledge regarding building science and building envelopes.

The Commission urges the HPO to take the leadership role in designating the Building Envelope Specialist or Professional, and that consideration of the Building Envelope Professional training program be included as part of the requirements for this designation. Ultimately, it is suggested, only the provincially-determined Building Envelope Specialist will be a recognized designation.

> ***Recommendation #12: That a Provincial Advisory Council (PAC) be established, through the authority of the Homeowner Protection Office's Research and Education initiative, and with the assistance of representatives from the development industry, the Architectural Institute of British Columbia (AIBC), the Association of Professional Engineers and Geoscientist Institute of British Columbia (APEGBC), the City of Vancouver, representative from other municipalities, Canada Mortgage and Housing Corporation (CMHC) and the provincial government.***

The *Homeowner Protection Act* (Section 13) provides for the PAC. The Commission encourages the HPO to continue developing the sophistication of this group and expand consumer representation on the Committee. As well, there may be a tendency for the work of the Committee to be deflected into issues which address personal agendas, rather than industry-wide issues, regarding building science and technology transfer. The Commission encourages the PAC to be focused and action-oriented.

CMHC, in one of its letters to the Commission, stated that it had not yet been invited onto the PAC. If this is the case, steps should be taken to do so.

> ***Recommendation #13: That Part 5 of the BC building code, through the Provincial Advisory Council, be reviewed prior to release, and that the City of Vancouver revisit its by-law, particularly Part 5, to ensure consistency with the eventual Part 5 of the BC building code.***

Part 5 was reviewed prior to its adoption in the 1998 Building Code. Minor revisions were agreed to by the ministry, industry, and the NRC. However, consistency between Vancouver's Building Bylaw and the BC Building Code were not forthcoming since the Vancouver Building Bylaw is the responsibility of the City. The Commission recognizes that the development and adoption of the BC Building Code is a participatory process including industry and government. The Commission respects this process. The intent of this recommendation was to ensure a deliberate review of the content of Part 5, with respect to building envelope failure. As well, the Commission would hope that all issues regarding the leaky condo problem, whether Part 5 or Part 9, relating to appropriate Code modifications, would be vetted through a rigorous process.

The Commission realized during its first set of hearings, that a high level of industry misunderstanding exists regarding the BC Building Code and Code interpretation. As a result, the first report attempted to address these issues clearly and concisely. Given the level of discussion

regarding the role and purpose of the Code (and Code content) which ensued during the most recent set of hearings, this Commission has allocated a significant amount of attention to this issue. The Commission is aware that there is considerable discussion taking place within industry to address Code issues, and that the Provincial Advisory Council is taking a leadership role in this regard.

It should be recognized that the responsibility for Code changes rests with the Ministry of Municipal Affairs; whereas, the Building Policy Branch and the HPO reside in the Ministry of Social Development and Economic Security. This organizational situation could be problematic over time. Therefore, the Commission recommends an appropriate organizational structures to facilitate Code development in Chapter FIVE, Section II, Provincial Government.

III. Blame it on the Code

A. Background

When the Commission reconvened its focus was on assessing the economic and financial impact on homeowners of wide-spread building envelope failures. This further inquiry was precipitated by the failure of New Home Warranty (NHW) and the growing magnitude of the economic and financial problem on BC residents, since many financial support measures, as recommended in the first report, were not implemented.

Building code matters--although important--were of a lower priority, primarily because the Commission felt the issue had been adequately addressed in the first report. Our solution was to have the industry, through the HPO's PAC, address code issues, in a participatory and reasoned process, assisted by the reinstatement of the Building Standards Branch.

The Commission's first report concluded that a number of factors, including a failure of the building process; building science issues; overheated housing market; and a poorly-interpreted building code, led to a disintegration in the quality of residential construction in BC. This judgment received widespread endorsement from the building industry, architects, engineers, inspectors, and the general public.

> *In our previous submission to the first Barrett Commission, we stated that, in our view, the building code is a minimum standard for life safety for buildings. It is not intended to deal, in detail, with specific issues such as building durability. We stated that amendments to the building code are unlikely to give the required protection to consumers with respect to building envelopes and, for that reason, we do not support attempts to prescribe solutions in the code. Adequate building envelope performance requires careful attention to detail by skilled and knowledgeable persons at both the design and construction phases.*
>
> *- Doug Williams, Consulting Engineers of BC*
> *December 6, 1999*

I think [you] dealt quite adequately with the Code issues in the last Barrett report.

- Dave Ricketts, Engineer
October 7, 1999

It is my opinion that the Code made little or no contribution to the problem of leakage-prone condominium buildings. Adequate code requirements for enclosures of buildings were in place when the condominium buildings were constructed. Virtually all inadequate performances of the walls, windows, and roofs of buildings derive from improper design.

- Tom Morstead, Consultant, BC Building Envelope Council
October 11, 1999

...there's been many factors brought before the Barrett Commission concerning the origins of the leaky-condo problem and, incidentally, I think you summarized them extremely well in your first report. I really liked that first report.

- Pierre Busque, Engineer, Presenter on Behalf of UDI
January 6, 2000

***Mr. Leask:** The question you answered was, is it a building code problem? And I can summarize your answer. No, its not. Right?*
***Mr. Watt:** Yes.*

- Douglas Watt, Building Envelope Specialist, City of Vancouver
November 16, 1999

The Commission did not anticipate that CHBA-BC and UDI, the industry's representatives, would employ a deliberate strategy of deflecting their role and responsibility by creating confusion around the Building Code. However, it appears that this was their strategy from the beginning.

The report on the Quality of Construction of Condominiums is to be released on June 19th [1998]. There is concern that no attention has been paid to the home builders. Technical issues have not been addressed. According to the Commission the current Building Code is fine.

Keith Sashaw reported that Jim Thomson and he had a good meeting with the Vancouver Sun Editorial Board at which they did a good job of articulating our position. This will serve as an opportunity to go on public record and state our case.

Keith noted that part of our strategy may include discrediting the Barrett Commission. Once the report is made public, CHBA-BC must develop a position to refuse to participate if we don't agree with the report.

- CHBA-BC Board Minutes
June 11, 1998

Documentation suggests CHBA-BC was in the habit of blaming the BC Building Code in situations where their members' performance could be drawn into question. Following the collapse of New Home Warranty, CHBA-BC--the sole shareholder--planned to deflect responsibility, according to minutes from the CHBA-BC Executive Committee meeting of April 1, 1999.

> *It was noted that it [the Liberal Caucus] should be made aware that although the government won't help out, they won't even consider other options, for example, the elimination of the Building Standards Branch could be blamed for the crisis [NHW's failure], as well as changes to the Code.*

The elimination of the Building Standards Branch, although regrettable, occurred in January 1997. All of NHW's major structural damage claims occurred on buildings constructed when the Building Standards Branch was in full operation. NHW's failure was discussed in Chapter TWO. NHW's agreements with builders required adherence to the Building Code. Never, in Board Minutes from 1976 - 1999, operations reports, education or training seminars, was the Building Code cited as being problematic. Finally, the Code that some in the industry have suggested is problematic, was adopted in December 1987, while many of the problem buildings were built using the 1982 BC Building Code. This Code, the same people suggest, is without problems.

Following the announcement of the reconvening of the Barrett Commission, the association appears to have implemented its earlier strategy. The Vancouver Chapter of the CHBA-BC released to the media Mr. James Currie's letters to the NRC and the provincial government, with statements endorsing the view that the Building Code was responsible for building envelope failures. This behaviour was reflected in the October 20, 1999 Minutes of CHBA-BC's Executive Committee.

> *Barrett Commission - This item is for consideration for the Association to declare the Commission as illegal. It was noted that the perception is extremely important, and further clarification will be required.*

The Urban Development Institute (UDI) represents over 400 corporate members which span the residential, commercial, industrial, and institutional real estate development sectors. Shortly after the release of Mr. Currie's letters by Peter Simpson of the Vancouver Chapter of CHBA-BC, UDI, on September 30, 1999, issued a public release stating that the refusal to act on Mr. Currie's warnings mirror UDI's experience. Maureen Enser, Executive Director, stated:

> *For years we have been warning a succession of ministers that the Building Code is not appropriate for BC's wet coastal climate and that serious problems could occur if it was not changed. We were repeatedly ignored. Mr. Currie's efforts to resolve the problem indicate these warnings were coming from within the bureaucracy as well, but that he too was ignored.*
>
> *We believe public confidence in government's ability to protect consumers has been further undermined by Mr. Currie's disclosure....The Commission's brief*

should be re-written to allow it to focus exclusively on government's role in this crisis.

On the same day, UDI President Olga Ilich, sent an open letter to about 1600 delegates to the Union of BC Municipalities in Vancouver, stating that the current Building Code is partly responsible for the leaky condo crisis. The letter stated that UDI believed the Code was the major cause of the problem and for years has been urging the provincial government to make it more appropriate to BC's climate. UDI's aim? A "Made-in-BC Code."

UDI appears to have adopted a public relations approach consistent with the CHBA-BC. However, on May 22, 1998, UDI made a major submission to the Barrett Commission, running over 85 pages. Of the many issues discussed, and recommendations made in UDI's submission, there was no specific reference to the BC Building Code being responsible, or partly responsible, for this crisis.

On November 1, 1999, Olga Ilich, Scott Cressey, Rick Genest, and Maureen Enser, on behalf of UDI, made a presentation to the Barrett Commission. They were asked about the "years of warning that the Building Code is not appropriate for BC's wet coastal climate."

> ***Ms. Allan:*** *So I'm asking, if that's how you still feel, I'd like to see the reports that would help us in our work to recommend the most appropriate go-forward situation. I would like to have those tabled with this Commission.*
> ***Ms. Enser:*** *We'll be doing a full written submission, and we will try to get all that information to you by the end of November, when we plan to have our written submission to you.*

The Commission greatly appreciated receiving the report tabled by UDI on February 17, 2000. Regrettably, there were no documents included in the submission which urged changes to the Code which could be attributed to a concern UDI held prior to October 1999. There was no information to substantiate the claim that UDI had been warning successive ministers for years *"that the Building Code is not appropriate for BC's wet climate."*

With respect to a call for a "Made-in-BC Code," BC and Vancouver have had their own codes for at least the period under review (1983 - 1999), and as the discussion of the follow-up to Mr. Currie's letters details, the process was participatory and very much able to meet the needs of our unique climate, had the participants wished to do so.

The Commission believes that there has been a deliberate attempt by CHBA-BC and UDI to create widespread misunderstanding about the role, purpose, and content of these codes. For builders and developers to point the finger at the Code and say they knew there would be problems, but were ignored, is both misleading and divisive.

The Commission has learned that UDI's approach to blame others is not a new strategy. UDI hired a public relations firm as explained in an article in BC Business, September 1999, *"to save the industry from certain devastation--a likely result of the Leaky Condo Disaster."* UDI's

public relations strategy set out to create fear around unionization and to discredit the Inquiry. The industry had concluded, before the Commission had started its work, that blame would be laid at the feet of the developers. *"James Hogan [the public relations consultant hired by UDI]...still seems a little surprised his clients weren't left holding the brolly."*

The Commission, in its first report, as in this one, confirms that this disaster is the result of many factors--the interpretation of the Building Code among them. It can only be described as a systemic failure; the building process failed as did the transfer of building science knowledge. Although the Commission raised concerns about the interpretation of the Code, and the lack of a general understanding within the industry of basic building science, there has been no discovery that the Building Code forced the construction of buildings which would fail. Design and detail, implementation and workmanship--these are the key areas of focus to find out what went wrong and why.

B. The Currie Letters

Shortly after the Commission reconvened public hearings in September 1999, it was learned through media reports that Mr. J.C. Currie, director of the BC Building Standards Branch until retiring in 1987, had written to the Provincial Minister of Municipal Affairs on December 12, 1991. His letter outlined his concerns *"over the direction taken by the National Building Code with respect to house construction."* He stated that he had *"written to Ottawa in 1987, outlining my feelings on the matter and a copy of that letter is attached; but there was no response."* On May 25, 1999, Mr. Currie wrote to the then Minister of Municipal Affairs, Jenny Kwan, referring to his past correspondence on the matter.

It should be noted that at no time was this correspondence, or the issues contained within the letter brought to the attention of the Commission during the first set of hearings. Given allegations that there was a "cover up" and that Mr. Currie's letters somehow provided the solution to the leaky condo crisis, the Commission undertook a comprehensive investigation, both in terms of the specifics of Mr. Currie's charges, and the process, if any, of follow-up to his comments.

The Commission contacted Mr. Currie and asked if he would make a presentation. Mr. Currie declined the invitation but agreed his letters would form the basis of his submission. He informed Commission staff that his letters had been made public as a result of copies being sent to Mr. Peter Simpson of the Greater Vancouver Home Builder's Association, a chapter of CHBA-BC. The Commission invited Mr. Simpson--who publicly endorsed Mr. Currie's letters--to come before the Commission and discuss his knowledge and understanding of the Code and building envelope failure. Mr. Simpson declined.

C. Investigation of Mr. Currie's Concerns

The Commission has found that each of Mr. Currie's letters were investigated and analyzed by industry building and regulatory authorities at the provincial and federal levels. Volume III - Documents, Part C, (in this edition included as Appendix III) provides the detailed correspondence from both provincial and federal authorities on Building Code issues, as well as copies of Mr. Currie's correspondence. The details are summarized below.

As the first Currie letter of December 1, 1987 was addressed to Mr. J. F. Berndt, Deputy Chairman, National Research Council (NRC), the Commission requested a presentation from the NRC which would, among other important issues, comment on the Currie letter and explain follow-up proceedings. Ms. Adair Chown, Senior Technical Advisor, Canadian Code Centre, made a presentation to the Commission on January 13, 2000.

With respect to the letters addressed to former provincial Ministers of Municipal Affairs, the Commission requested copies of internal correspondence addressing Mr. Currie's concerns. The Commission also requested a presentation from the Building Policy Branch (formerly the Buildings Standards Branch), to ascertain steps taken in addressing the concerns both in 1987 and 1992. Mr. Bob Thompson, Acting Director, Building Policy Branch, made a presentation on November 25, 1999.

With respect to the validity of Mr. Currie's concerns, from the perspective of building science and building envelope failures in the coastal climate, the Commission also heard from engineers, architects, professional associations, and other practitioners, addressing each one of the concerns Mr. Currie raised in his letters.

D. Mr. Currie's Concerns

The essence of Mr. Currie's correspondence boils down to six concerns, including:

1. the culpability of the code and the bureaucracy;
2. permeance of materials in the air barrier system;
3. energy conservation;
4. moisture entrapment;
5. moisture content of lumber; and
6. ventilation.[31]

The Commission made extensive inquiry into each of these concerns.

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[31] Since the particular ventilation concerns raised do not have any relevance for building envelope failures, these are not addressed here. It should be noted that Mr. Currie's concerns regarding ventilation were accommodated in the 1985 BC Building Code.

1. **The Fault of the Code and Bureaucracy**

> *On the matter of responsibility it is my firm opinion that the blame lies with the Building Code....To complicate the situation we have the usual attitude of genuine bureaucracy, and Ottawa most certainly falls into this category.*
>
> *- J.C. Currie, May 25, 1999*

Mr. Currie's correspondence to the NRC was provided to the Standing Committee on Houses and Small Buildings (Part 9) for its consideration. This was reviewed at the Committee's thirty-fifth meeting, April 12 - 14, 1988. The minutes recorded that:

> *...some of Mr. Currie's concerns may be partially satisfied by the proposed revisions to [NBC Section] 9.26 and [Subsection] 9.33.3 and the accompanying appendix notes....It was further noted that a fairly leaky [breathable] house can still be built under existing NBC requirements so that the options suggested presently exist. It was therefore agreed that no action be taken.*

The 1991-1992 correspondence received by the NRC largely reiterated the concerns expressed by Mr. Currie in his 1987 letter. The letter was addressed to the then Minister of Municipal Affairs, Robin Blencoe. It was subsequently forwarded to the NRC by architect Jim Traynor of David N. Spearing & Associates. The correspondence was then forwarded to the Standing Committee on Houses and Small Buildings and reviewed at its forty-first meeting, November 16 - 17, 1992. After review and discussion, the Committee concluded that, without solid technical documentation, it could not respond to the opinions expressed in the letters.

It should be recognized that the NRC Standing Committees are responsible for various technical areas in the Codes and are drawn from all segments of the construction industry, including architects, engineers, manufacturers and product suppliers, building owners and developers, and building users. BC representation on the Part 9 Committee is extensive. From 1980 to the present, it has averaged 18 percent from British Columbia. During the review of Mr. Currie's correspondence in 1988, representation from BC included David Verge, CEO, New Home Warranty, and Terry Hale, MAIBC. In 1992, representation included Richard Stewart, Stewart Communications, Steve Gertsman, Building Technology and Code Consultant, and Terry Hale. Final decisions on the technical content of the Codes are made by these Committees, not NRC staff.

The Commission requested, and received, from the Ministry of Municipal Affairs, the Ministry's investigation of Mr. Currie's allegations in his letters of 1991 and 1999. It should be mentioned at this point that in 1985, while Mr. Currie was still Director of the Building Standards Branch, the Code Review Process in British Columbia became a participatory process, whereby a "Made-in-BC Code" was officially adopted.

> *...between '85 and ultimately '87, when the '85 National Code, with changes, was adopted in BC, a fairly elaborate public process was put into place...from the*

builder to the designer and everywhere in between, and it was advertised, through the industry, that we were soliciting, basically, proposals to modify the 1985 National Code for use in British Columbia. And my recollection is we received some 400-odd proposals from code users around the province, of suggested changes. Some of them were wacky, some of them were extremely good. The Branch itself promulgated some changes that went into the code; they were produced in house....We appointed a Code Review Committee, which was made up of a number of knowledgeable individuals from the industry...and the responsibility for that Committee was the Building Standards Branch....Forty-one individuals from the building industry were assembled, and appointed as a voting committee. The Branch--the Ministry--had basically agreed that whatever came out of that process would become the next edition of the code.

- Bob Thompson, Acting Director, Building Policy Branch
November 25, 1999

Therefore, Mr. Currie, as Director of the Policy Standards Branch, and in charge of the Code development process, had ample opportunity for his views to become known and adopted in the 1985 BC Building Code. In fact, one of Mr. Currie's main concerns in his letter to the NRC in 1987 was included in the BC Building Code before it was adopted in 1987.

Mr. Thompson: *Actually in '87, when he [Mr. Currie] wrote his letter to the national code people...that's the point where we went from just a vapour barrier to a sealed vapour barrier. I think his concerns there were, "We now have this sealed vapour barrier on the inside, which we know won't be perfect," and I'm sure he was also aware that this was trying to address the air movement issue. And we have another vapour barrier, not an air barrier, but another vapour barrier on the outside, and he was concerned that we were ratcheting up, if you like, to a point where we might have problems with the inside of that wall.*

Ms. Allan: *But the solution was to create enough of an air space?*

Mr. Thompson: *The solution was to make sure that the exterior membrane, or membranes, depending on how the building was built, would allow moisture to evaporate to the outside.*

Mr. Allan: *Which the BC Building Code had adopted?*

Mr. Thompson: *Yes.*

Ms. Allan: *So would it be fair to say that the letter, in 1987, wasn't about BC at all, it was a letter to the National Research Council saying, "We've got it right, the rest of the country might be getting it wrong?"*

Mr. Thompson: *I think, yeah, it's fair to say that, at that point, we weren't addressing a unique BC concern. We were addressing a general building science issue that we might be trapping moisture inside the wall from interior sources.*

Ms. Allan: *Which BC was avoiding because of this process of 41 participants from the industry...adopting a code that had addressed, "if you're going to tighten it up, you also do this adjustment"?*

Mr. Thompson: *Yes.*

Mr. Currie retired in 1988 with some of his concerns and opinions having been incorporated into the 1985 BC Building Code. The same Code Review Process existed for the 1992 BC Building Code.

> ***Mr. Thompson**: [Mr. Currie's subsequent letter] was undoubtedly brought about because he saw the new code, which he wasn't involved with, and still had a concern....Our feeling was that the code did adequately address it, because it had gone through the appropriate technical review....*
> ***Ms. Allan**: So the issues in the '92 and the subsequent letters, was there anything in those letters that was new information to you or the process?*
> ***Mr. Thompson**: No. It was a repeat of his concerns from before he retired.*
> ***Ms. Allan**: That had been addressed?*
> ***Mr. Thompson**: Yes.*

The Commission believes that Mr. Currie's many concerns have been adequately addressed through the appropriate process established to ensure that BC has not only the responsibility for its own Code, but also adequate opportunity to adjust it on the basis of industry knowledge and wisdom. If there is a problem with the 1985 and 1992 Codes, the fault would surely lie with the Code Advisory Committees, initially established by the Building Standards Branch under the direction of Mr. Currie. These were the people who voted on, and developed, the BC Building Code.[32]

The Commission also wonders how the 1985 BC Building Code could have led to the building envelope failures experienced in condominiums since the Code changes were not adopted until December 1987. Multi-family buildings employing this Code were not constructed until at least mid-1988 and even into 1989. The Homeowner Protection Office reports that, of the 244 buildings registered for loans, 21.3 percent were built prior to 1989; with 6 percent being built prior to 1984.

2. Permeance of Materials in the Air Barrier System

> *Provide a permeable air barrier...over the sheathing. This should be tightly fitted at all openings, to prevent wind penetration into the framing system.*
> *- J.C. Currie, December 1, 1987*

As stated in the NRC submission to the Commission, Mr. Currie's concern over the permeance of materials in the air barrier were understood as part of good building practice. The air barrier system is the assembly within the building envelope that provides a barrier to the flow of air and vapour transfer due to air leakage. It can be constructed in various places within the wall assembly. The role and purpose of the air barrier has been understood for

[32] There were four CHBA-BC representatives on the 1987 Code Advisory Committee. The representatives on the '92 Code Advisory Committee were Richard Stewart and Gary Grelish.

decades and has been included in the NBC since 1965.

> *...the Code assumes an understanding of good construction practice. The Code permits flexibility in the design of building envelope assemblies including the location of the airtight elements of the air barrier system. The vapour permeance of materials in the air barrier system is of concern only where these materials are installed toward the colder side of the assembly. The Code provides no requirements that would preclude installation of these materials on the warm side of the assembly. For clarification, this issue was addressed, in any case, in the 1990 NBC and additional explanatory information was included in the Appendix to the Code.*
>
> *- Adaire Chown, Senior Technical Adviser, National Research Council*
> *January 13, 2000*

3. Energy Conservation

> *My concerns stem from what appears mainly to be a blind pursuit of energy conservation, to the complete exclusion of all else....*
>
> *- J.C. Currie, December 12, 1991*

The National Building Code does not address energy conservation. The BC Building Code, on the other hand, does have requirements specifying minimum thermal resistance values for insulation which were introduced--only for houses--in the 1992 Code.[33]

> *There is perhaps an unfortunate coincidence that the vapour barrier requirements were being upgraded to a sealed vapour barrier in the mid-80s. Some people seem to think that's in response to the energy crisis. In fact, no, it's simply a response to the code objective of protecting the wall assemblies from deterioration, and providing recognition that there was a more critical mechanism happening here, in the form of leaking air, that they had to address, and did so by bringing about the sealed vapour barrier or air barrier requirement, and then followed that up with a choice of how you go about doing that in a later code. But it had nothing to do with conserving energy.*
>
> *- Bob Thompson, Acting Director, Building Standards Policy, Ministry of Social Development and Economic Security, November 25, 1999*

> *Requirements for vapour barriers have been included in the code since its first edition in 1941. The evolution of the code, to also identify explicit requirements for air barrier systems, is not in response to energy concerns, but rather in recognition of building envelope failures. And these requirements reflect a better understanding by researchers and practitioners that air leakage is the more significant moisture transfer mechanism, and the first requirements that explicitly*

[33] It is also interesting to note that the Commission has learned that R2000 single-family homes, whose basis is premised on energy conservation, have a history of superior building envelope performance as compared with traditional housing.

referred to air barrier systems were provided in the 1965 National Building Code, long before the energy crisis of the '70s.

- Adaire Chown, Senior Technical Adviser, National Research Council
January 13, 2000

The BC Building Code and Vancouver Bylaw do have some specifications that are linked to energy efficiency. However, these cannot be linked to building envelope failures in any way, as explained by Douglas Watt, Building Envelope Specialist, City of Vancouver, in his testimony of November 16, 1999.

Ms. Allan: *...what do the Building Code and the Energy Code have to do with each other?*
Mr. Watt: *In the City of Vancouver, we have linked our energy provisions into the Vancouver Building Bylaw....The National Model Energy Code, at the moment, is not used, it is not accepted in a lot of jurisdictions....*
Ms. Allan: *So the BC Building Code doesn't have the Energy Code incorporated into it in any way?*
Mr. Watt: *No.*
Ms. Allan: *So when we hear that the Energy Code and the tightening up of homes over the last 15 years caused these problems, what you're saying is that, indeed, in the BC Building Code, it's not linked?*
Mr. Watt: *The specifics of the model Energy Code are not linked into the Building Code, but there were some minor changes that may be argued were energy-related that were made in the National Building Code, which were then reflected in the BC Building Code, but they were minor in substance.*

There still seems to be a misconception that poly was introduced for energy conservation reasons and that it is mandatory. Poly was introduced in the early 1970s and, as was explained in the first Commission report, it is optional. The Commission was recently informed by Ms. Chown that in 1982, according to the Canadian Construction Material Centre, there were *"37 non-poly vapour barrier materials produced by 11 different manufacturers, and between 13 and 17 of those were type 1. They were materials that were kraft paper based with foil laminations with or without asphalt, asphalt-coated kraft, and foil-backed Gypsumboard."*

4. Moisture Entrapment

The real issue is moisture entrapment in sealed wall systems; in virtually all cases this would involve wood-frame construction....When moisture problems first surfaced, I was obviously interested, and while I did not inspect any of the sites, television coverage clearly showed the existence of rampant dry rot....However, I have no doubt whatsoever that the majority of failures are due to moisture from within the buildings, not leaks.

- J.C. Currie, May 25, 1999

There is no question that the leaky condo problem is due to water accumulation in wall assemblies. However, Mr. Currie's concerns were addressed to single-family homes, not multi-family complexes. The vast majority of building envelope failures are with multi-family homes. As well, construction problems do not involve only wood-frame buildings. The Commission is aware of an increasing problem with high-rise residential building envelope failure.

The reference by Mr. Currie to dry rot also seems to be in error. Richard Kadulski, architect, wrote to Minister Kwan regarding Currie's allegations on July 13, 1999 and stated: *"Forestry biologists say that most of the problems we see in BC is with wet rot. Dry rot is rarely seen here. There is a difference in the action of the two."* It should be recognized that Mr. Currie was referring to television coverage of leaky condos, not to what he himself had observed.

Although moisture moving into the walls from within the building could, theoretically, be a problem, it is not the problem which has given rise to the leaky condo crisis; research and experience clearly show it is rain. According to the Survey of Building Envelope Failures in the Coastal Climate of British Columbia sponsored by CMHC--the most in-depth research into the technical causes of multi-unit residential buildings to date, the primary source of water is wind-driven rain from outside the building.

> *Excessive moisture in Canadian housing is not unique to British Columbia, and can be due to such factors as improper ventilation, from inadequate maintenance or improper occupant practices, or result from a failure of the building envelope to prevent moisture entry or removal. In the case of BC condominiums, we determined from the 1996 survey that the reason for the water problems was due to a failure of the building envelope, and that almost all of the problems were associated with water entry from outside the building and not from diffusion of moisture from inside the home.*
>
> *- Jim Lynch, General Manager, CMHC*
> *November 3, 1999*

Other testimony on internal and external moisture was extensive and included the following:

> *...my concerns with his point of view on this are that, although he may have forecast a condo moisture problem, he really identified it based on the wrong issues. He was really--from a technical point of view, he was ascribing the problem to interior moisture, not exterior moisture, and, you know, that's fundamentally not what happened....You know, by his own admission, Mr. Currie never inspected a leaky condo, so I think that should cause us to suspect some of his conclusions regarding them. In his letter that I've read, he really demonstrates some fairly poor building science knowledge. He's got some real basics wrong in there. And I had difficulty because he didn't identify any specific*

aspects of the Code which are deficient. You know, it was just kind of a general thing: "This is interior moisture and the Code is not right." So I don't feel that people should be hanging their hat on this.

- Dave Ricketts, Engineer
October 7, 1999

...arguably, we repair more buildings than anybody else. In the vast majority, and I would say 99.9 percent of the cases, the moisture got in through rain water....

- Pierre Gallant, Engineer
November 1, 1999

5. Moisture Content of Lumber

The moisture content of lumber when installed is required by the Code to be 19% or less, a level classed as "dry" for grading purposes, but I question whether this is ever checked on a building site, and lumber is regularly "green" or even saturated when delivered....Framing could be enclosed long before reaching the 19% level.

- J.C. Currie, December 1, 1987

Mr. Currie quite correctly raises concerns over the moisture content of lumber. If climatic and industry conditions are such that a wood-frame wall must be finished before the moisture content can be reduced to 19 percent, all the relevant codes, over the relevant time periods, required an alternative construction method be used.[34] That is, a wall should never be installed if the lumber has greater than 19 percent moisture content. To expect the Code to be self-enforcing is unreasonable; enforcement is the responsibility of municipal inspectors.

The Commission is aware that Letters of Assurance must be signed by qualified architects and engineers. These letters indicate that the Building Code has been followed and the professional has carried out on-site inspections. These assurances include basic building knowledge such as, "wood should not be wet when the wall is enclosed."

The Commission received representation which recommended only pressure-treated wood be used in wood-frame construction. Although the merits of rot-resistant wood are clear, designating it as the only wood which can be utilized in construction, seems unnecessarily restrictive.

[34] See, for example section 9.3.2.5. Moisture Content of the 1985 BC Building Code: 1) Moisture content of lumber shall not be more than 19% at the time of installation.

IV. Other Building Code Issues

The Commission was presented with a number of issues related to the Building Code in both sets of hearings including the following topics:

1. Performance versus Prescriptive Code
2. Minimum Standards or Best Practices
3. Should Face Seal be Prohibited?
4. Repairs and the Code

Although the findings throughout our inquiry have resulted in the Commission developing opinions regarding the most appropriate stance on each of these issues, they should still be tabled with the Provincial Advisory Council of the HPO for discussion and closure. It is the industry which ultimately has to work--on a go-forward basis--with the decisions made on these issues. Since the importance of these issues is so acute, it is likely that sound and substantiated decisions will be forthcoming. For example, the Building Code has been a performance-based document with some prescriptive elements, particularly Part 9. If the industry wishes to shift that approach, then it should do so, and be prepared to work within the revised framework.

There has been discussion of removing Part 9 from the Building Code in order to form a separate Code for housing. This does not mean that Part 9 should have been excluded from the Building Code sooner. Rather, it could mean that the nature of residential construction has changed enough to warrant a clear delineation between small, relatively simple buildings, and larger, relatively complex ones. It could also mean there is full recognition that only professional architects, engineers, and technicians should deal with the performance-based Building Code. Whereas, less technically-trained or experienced practitioners could use a prescriptive Housing Code.

A shift in approach does not mean the previous approach was in error, or caused the current problem. If Part 9 were separated from the rest of the Building Code, details on the prescriptive content to be included in the Housing Code would still need to be discussed. All the issues around vapour and air barriers, vapour diffusion, and water ingress or egress, will still need to take place in order to develop a common understanding of the building science.

1. Performance versus Prescriptive Code

Whether the BC Building Code or Vancouver Building Bylaw should be performance-based or prescriptive underlies many discussions regarding the appropriateness of the Codes for our province. Many presenters have pointed out that, although there are prescriptive elements in Part 9, the underlying principle is that the Code should be a performance-based document.

> *It's the nature of the professional business that people will always have differing opinion on how things should be done. It doesn't mean*

they're inappropriate or they're wrong; there's just different opinions on how things should be done, and we do not believe that we should be writing specific prescriptive descriptions about how things should be built in the Building Code....There are appropriate places for that to happen--things like the Best Practices Guide being published by CMHC, there are other avenues, there are discussions happening at BERC, there are reviews of typical assemblies being tested right now in lab facilities out at Forintek to...review how some of those recent changes and innovations will work in the climate of this province.

- Douglas Watt, Building Envelope Specialist, City of Vancouver
November 16, 1999

***Ms. Allan:** Towards the end, you mentioned that what you are recommending is a performance-based code, not a prescriptive code, I assume, and to that end, are you suggesting that the code, as it stands now, particularly Part 9, is too prescriptive?*
***Mr. Busque:** I believe so. Short and sweet, yes.*
***Ms. Allan:** So the recommendations that you're putting forward should be viewed from the point of view of developing a greater knowledge and awareness about what should be done, and that it's really up to the design professionals, the builders, people making the decisions to obtain that knowledge, that it's not the role of the code to provide that guide?*
***Mr. Busque:** I'm in total agreement with that, that the code is not an education tool.*

- Pierre Busque, Engineer, Presenting on behalf of UDI
January 6, 2000

...the focus here [Part 9.27.2.1. Required Cladding] is on control of rain penetration at the cladding plane, and secondarily, the provision of flashings and sheathing membranes to redirect incidental moisture ingress...it's these performance requirements that state what must be achieved. They must be complied with, regardless of what other provisions apply in the code. Knowledge of acceptable construction is critical to compliance. The code doesn't tell designers or builders or manufacturers or regulators everything they need to know in order to achieve this end. The code acknowledges and relies upon the massive amount of information that's available on design and construction, and recognizes demonstrated acceptable performance. It does not attempt to serve as a design guide or to describe acceptable construction details.

- Adair Chown, Senior Technical Advisor, NRC
January 12, 2000

2. Minimum Standards or Best Practices.

Related to the discussion of a performance or prescriptive Code is the notion of whether the Building Code should provide minimum standards for life safety and health or be a best-practices manual.

Clearly, without going into the comments in great detail, the practical reality of a Code--a binding document in law--of becoming a best-practices guide would make a mockery of the professional architect's and engineer's role, and of residential building as a market-driven industry.

> *The Code is a minimum standard. It's not a best-practice guide, it does not replace sound engineering or architectural judgment. To rely solely on the Code is admitting one's own lack of knowledge. The Code is simply to guide minimum standards, primarily for life safety....We could start to be more prescriptive and say do everything in a certain fashion...[but] would you like to have medical journals to be prescriptive?...I think you have to set rules of the game, but you must not replace sound judgment, you must not replace human beings. The Building Code is there as a minimum guide, it works, it needs to be interpreted properly.*
>
> *- Pierre Gallant, Engineer*
> *November 1, 1999*

> *Just to give you a sense of how I see the Code fitting in, we have a Building Code and it lays out basic rules of the road, if you like. You know, you don't want water to get in, and you want to control vapour diffusion and air leakage and things like that, you want things to be durable, and so on. The Canadian Building Digest would represent one example of stuff that has existed out there for 30, 40, 50 years, giving fundamental guidance on how to manage moisture sources in buildings, and that would be sort of the second level. Here's your objectives. Here's the basic building science. CMHC has put out a whole host of publications talking more specifically about how you do that, with real assemblies and real details. And an architect or a designer would typically consider all of these things and come up with a specific building design that's appropriate....Relying on the Code as your only means of design is like trying to use the rules of the road for driving....You have to know a lot more to drive your car than simply the fact that you have to stop at a red light.*
>
> *- Dave Ricketts, Engineer*
> *October 7, 1999*

3. Should Face Seal Be Prohibited?

The prohibition of face-seal wall assemblies on multi-family construction is currently in place in the Vancouver Building Bylaw and by-laws adopted by New Westminster and Richmond (municipalities have the power to adopt by-laws to supplement the BC Building Code). The reason for such a drastic step is municipal concern over inappropriate design decisions. This is regrettable. Face-seal wall assemblies can and do work under certain environmental conditions. They are relatively inexpensive wall assembly systems and, ironically, protect against moisture from vapour diffusion and interior air flow.

Concerns regarding face-seal wall assemblies were brought to the attention of the Commission during its first and second hearings. It is very important to point out that the Building Code did not require face-seal wall assemblies at any time. Rather, they allowed their construction, if design professionals believed they could work. Part 5 of the Code very clearly states that water should not get into the building and, if it does, it should be able to get out. Part 9 also states very clearly that water should not get into the wall assembly.

Face seal is a design and detail issue. If industry professionals cannot be trusted to make appropriate design decisions for this region, then perhaps face seal, under any conditions, should be prohibited. This does not implicate the Code; this indicates the lack of industry knowledge about building envelope science and design features necessary in southern British Columbia's rainy climate. Everyone knows it rains here. Why pretend otherwise?

Non-traditional stucco methods (other than the traditional prescriptive method detailed in Section 9.28 - Stucco, BC Building Code), seem to be among the most common claddings to fail, particularly on buildings without overhangs and which are exposed to wind-driven rain. Any non-traditional stucco building, with envelope failure, is a Building Code violation. Non-traditional stucco, such as acrylic stucco, is not described in the Code which means its use falls under Section 2.5.1.2 - Evidence of Equivalent Performance, in both the National Building Code and the BC Building Code. Section 2.5.1.2. states:

> *1) Any person desirous of providing an equivalent to satisfy one or more of the requirements of this Code shall submit sufficient evidence to demonstrate that the proposed equivalent will provide the level of performance required by this Code.*

4. Repairs and the Code.

Appropriate repair methods are of critical concern. The debate over the role, purpose, and content of the Code raises questions regarding its use during the

repair of problem buildings. Just as the Commission understands it is technically possible to design and construct face-seal wall assemblies that function properly, it is also possible to design and construct rain-screen wall assemblies that do not perform well. The Commission was presented with examples of failed rain-screen wall assemblies. A poor design is just as susceptible to problems as a good design constructed poorly.

> *...we can say unequivocally that the knowledge exists to design and construct sound buildings. Qualified professionals can and do provide this expertise to projects every day. The pressure that led to this problems in the first instance continues to exist, in our judgment and, ironically, strata owners who are undertaking repairs to leaking buildings may be perpetuating some of the problems....The fundamental cause of the leaky condo problem was the industry's failure to appreciate the significance of proper design and construction of the building envelope. As a result, the industry generally failed to apply building science relating to the control of moisture to the design and construction of residential buildings.*
>
> *- Philip Sunderland, Association of Professional Engineers*
> *December 6, 1999*

As building repairs are conducted under the Code of the day--as opposed to the Code in place when the building was initially constructed--the Commission acknowledges that the cost of remediation may be higher in some municipalities because professionals cannot be trusted to make sound decisions regarding design.

Since the Code did not cause the premature building envelope failure, repairs to the condos can be undertaken in an effective manner. The Commission believes that it all comes back to appropriate interpretation, understanding of the building science, and quality on-site control. There continues to be a major need for education, training, and appropriate expertise at key points in the decision-making process. The Commission feels, however, that voluntary education is not occurring quickly enough to instill the ability necessary for sound building envelope design and construction, for both new and repair activity. Mandatory education, training, and examination must be implemented.

Part II - Volume II Recommendation #2: The Homeowner Protection Office, with the support of the Provincial Advisory Council, to provide the leadership for minimum mandatory education for multi-family residential design and construction. Such education to include the testing of architects, engineers, and registered builders, regarding the basics of building science and interpretation of the BC Building Code and Vancouver Building Bylaw.

Chapter FOUR

The Industry

I. Builder/Developers

> *The fundamental cause of the leaky-condominium problem was the industry's failure to appreciate the significance of proper design and construction of the building envelope. As a result, the industry generally failed to apply building science relating to the control of moisture to the design and construction of the residential buildings. That technology and knowledge exists, and existed then, to design and construct sound buildings, but we know that, when the generation of buildings that now leak were constructed, engineers with the requisite skill were not typically engaged to provide this expertise. We believe that one reason for this is that, due to the market pressures, developers and their design teams were focused on lowest initial cost and, therefore, did not have an interest in elements that might have been more costly initially but had the potential to reduce longer-term operating and maintenance costs. This has been the case for new construction and as we discuss below, unfortunately appears to becoming an issue of repairs of defective buildings.*
>
> *- Philip Sunderland and Doug Williams, APEGBC and CEBC*
> *December 6, 1999*

The first Commission's report concluded that there was a systemic breakdown in the residential construction industry, a catastrophic disaster resulting in serious harm to the health, safety and welfare of thousands of British Columbians. The consequences are both devastating and pervasive. Premature building envelope failure and the lack of quality in design and detail has led to a burden, not only on the unfortunate homeowner, but ultimately on all BC residents. The Commission's first report did not single out one particular cause for this systemic failure. The failure was due to a number of reasons inherent in the building process and application of the building science.

A. The Building Process

Issues in the building process contributing to the failure were:

i) *an inability on the part of municipalities to effectively monitor building quality; to make certain inspectors play a meaningful role in ensuring building standards; or to enforce building codes;*
ii) *a lack of provincial monitoring to ensure accurate interpretation of the building code, as well as its performance requirements;*
iii) *a lack of developer, builder, and general contractor responsibility--often*

facilitated through protective corporate structures;

iv) *architects who have been unable to maintain professional responsibility in translating designs into quality physical structures;*

v) *engineers who have been unable to ensure their involvement in the process will lead to quality construction of the building envelope;*

vi) *a lack of training, skills, and qualifications that have led to a deterioration in the quality of worker performance;*

vii) *an inadequate home warranty program which, in the majority of cases, is faced with a conflict of interest between its service to the homeowner and its obligation to the developer;*

viii) *a mortgage guarantee system which tends to serve the interests of the residential construction industry and financial institutions, without due regard to the consumer, who buys its services;*

ix) *a lack of information from the builder to the strata council; and*

x) *a lack of understanding regarding roles and responsibilities of strata councils and management companies, leaving the homeowner confused and alone.*

B. Building Science

Issues in building science contributing to the failure were:

i) *a poorly interpreted building code;*

ii) *municipal by-laws that can lead to inappropriate design, exacerbated by architects, who do not understand the implications of their designs;*

iii) *the use of new materials without an understanding of how they will be affected by our climate;*

iv) *a loss of collective memory, and lack of conventional wisdom, among inspectors, architects, engineers, developers, and contractors regarding the requirements for effective building; and*

v) *ineffective communication and transfer of knowledge among the professionals and business people (who understand the issues), to others involved in the building process.*

The first report, tabled on June 16, 1998, included a detailed review of the residential housing industry and made 82 recommendations to ensure that poor-quality housing would never be constructed again, and that the problems already created would be addressed through quality repairs and financial support for people who had, or were going to, suffer financially.

Builders--both individually and through their associations (CHBA-BC, UDI, and BC Construction Association) acknowledged the absence of performance standards and the lack of qualifications for builders, contractors, and subcontractors. Mandatory builder licensing and regulation, to establish a level playing field, was strongly advocated.

About 1,400 residential builders are currently licensed in accordance with the HPO legislation.

All registered builders must qualify with a FICOM-approved warranty provider as a pre-condition of registration. The minimum, mandatory warranty coverage on all residential construction in BC must include 2 years on labour and materials, 5 years on the building envelope including water penetration, and 10 years on structure.

There are many builders who have built homes throughout this province, and built them well--particularly, single-family homes, duplexes, and townhomes. There are multi-family homebuilders whose structures have performed well or, when problems have arisen, have fixed them. Then there are a number of builders who put up multi-family homes and did it poorly. They made poor design choices; poor materials choices; bad hiring decisions; or they became more concerned about cutting costs and corners, than building homes that would last a generation or more. Some of these builders are no longer operating within the province; others are changing their building practices.

The quality of new construction is one area which is clearly being addressed. The Commission recognizes now, as it did in its first report, that licensing and regulation of building envelope repairs, is of critical importance.

> ***Recommendation #23: That all renovation contractors performing building envelope reconstruction greater than $2,000 per unit or $10,000 for single-family and duplexes, be licensed and regulated by the Homeowner Protection Office.***

Recommendation #22 is incorporated in the *HPO Act*, Section 14, while Recommendation #23 is incorporated in the *HPO Act*, Section 18. The regulation and warranty of building envelope repairs has not yet been brought into force. However, the HPO has been working with industry on a proposal to be effective in the Spring of 2000. There is room for concern about the adequacy of the proposed repair warranty and the response of the private sector warranty providers.

II. Professionals

> ***Mr. Leask:*** *If a hypothetical consumer has proper architectural advice in the last six weeks of the year 1999, can he or she purchase a newly constructed building, or unit in one, with confidence?*
> ***Mr. Neale:*** *Absolutely, absolutely.*
>
> *- Derek Neale, AIBC*
> *November 17, 1999*

During the first Commission hearings in 1998, testimony was received from Mr. John Davidson, representing the Architectural Institute of BC (AIBC).

> *We are perplexed as problem solvers by the multiple causes and the variety of combinations of those causes from building to building. We are frustrated that*

after more than three years of effort, we do not have a complete and satisfactory answer to the cause, nor full agreement on the best repair strategy.

The area of building envelope has traditionally been the responsibility of Architects. However, there is much specialized expertise in the engineering field. The Association of Professional Engineers and Geoscientists (APEGBC) is given the authority to regulate the practices of professional engineers and geoscientists, under the *Engineers and Geoscientists Act.*

In general, there are inter-recognition agreements between the AIBC and APEGBC on defining where these professional services are required. Both associations should be encouraged to allocate more resources on programs for technical review concerning building envelope detail for their members.

In addition, the Commission supports the involvement of other technical groups and associations such as the Applied Science Technologists and Technicians of British Columbia (ASTTBC). Such groups have been working with both Architect and Engineer Associations on guidelines for the role of ASTTBC members in the design and field review of Part 9 buildings and the minimum level of professional design on all new housing.

Recommendation #14: That training provided through educational institutions, and continuing education, offered by professional associations, clearly identify the special requirements for multi-family building envelopes in British Columbia.

The Commission appreciates the fact that AIBC and APEGBC have developed the Building Envelope Education Program (BEEP) for training professionals in the field of envelope performance. This program should be open to anyone in the field with an interest in understanding the building science issues, and the program should expand its on-site component. The Commission is unaware that building envelope issues have been included in the curriculum of more formalized educational institutions.

Further education, in undergraduate and graduate programs at the university level, is necessary. A proposal has been developed to create a Chair in Building Science and Enclosure Design at the University of British Columbia. This is to be created among the School of Architecture, the Department of Civil Engineering, and the Department of Wood Science. The Commission believes this proposal should be seriously studied by the PAC of HPO, considering the competing demands for research and education in this area. The Commission's recommendation for a contribution from financial institutions would generate adequate resources for such a proposal.

Recommendation #15: Any architect or engineer involved in Letters of Assurance and the field review process must have the qualifications, or sub-contract, the building envelope design and review to a qualified Building Envelope Specialist, to be defined by AIBC and APEGBC in consultation with the Provincial Advisory Council.

The Commission supports the good work undertaken by both AIBC and APEGBC defining a qualified Building Envelope Professional (BEP). However, it is important that the authority for this area rest with the HPO, assisted by the PAC. In light of the need for clarification, this recommendation is re-worded as follows:

> ***Recommendation #15 (revised): Any architect or engineer involved in Letters of Assurance and the field review process (for new construction or repairs) must have the qualifications, or sub-contract the building envelope design and review to a qualified Building Envelope Specialist, to be defined by HPO, in consultation with AIBC and APEGBC.***

> ***Recommendation #16: That the AIBC and APEGBC, revise current letters of assurance and field review process to include a more detailed checklist of building envelope components and submit to the Provincial Advisory Council for endorsation.***

The Commission understands that Letters of Assurance were amended and strengthened in the 1998 BC Building Code. However, further strengthening of the Letters of Assurance could be accomplished by identifying the building envelope as a separate discipline, similar to the way structural, mechanical, or other disciplines are referenced.

> ***Recommendation #25: That the AIBC impress upon its members the need for fulfilling their long-standing obligation to the public through an active identification of the issues involved, and a full-scale approach to improving Architect's standards of practice.***

Mr. Davidson, AIBC, in his presentation on November 17, 1999 stated:

> *Recommendation 25 was really advice to the Institute from the Commission to reinforce with our members the importance of providing appropriate and complete professional services to our clients and keeping in mind the obligation we have to the public in all that we do. Immediately after the release of the Commission report and our appearance last year, we issued several bulletins to our members, emphasizing the importance of exactly those things, the provision of only full services, to not diminish the provision of professional services, to use standard forms of agreement which lay out very clearly the requirements for those services, and also to reveal the insurance status of the architect to the client before commencing the work.*

> ***Recommendation #26: That the requirement for appropriate professional services on residential buildings, as constituted in the Architect's Act, be enforced.***

The Commission is not aware of any action taken by AIBC to ensure that the *Architect's Act* is enforced pertaining to the requirement that all buildings, 5 units or greater, have a qualified

architect involved in the design process. The reason for the Commission's recommendation in this regard was that the Commission heard testimony that unqualified designers were involved in designing multi-family construction (which could lead to an inappropriate reliance on Part 9). Enforcement of the Act would solve this problem.

> ***Recommendation #32: That the APEGBC and AIBC, along with other members of the Advisory Council to the Homeowner Protection Office develop a strategy for identifying building envelopes at risk, develop a set of sound practices for remediation, and distribute the information for use by the industry, strata councils, and homeowners.***

The Commission is not aware of steps to implement the above recommendation in a meaningful way. The Commission is aware that the HPO is involved with the Building Envelope Research Council's work on remediation and that this will be integrated into information sessions with Stratas. However, the proposed Compensation Plan requires, more than ever, that the above recommendation be fully and appropriately implemented.

Prior to the first Barrett Commission of Inquiry, CMHC was instrumental in founding a consortium called the Building Envelope Research Council (BERC), and has worked actively with the housing industry, financial institutions, government agencies, and others to find solutions to the moisture problem in residential housing in BC. CMHC is an important partner in the Research and Education function of HPO and should be included as part of the education and research strategy.

> ***Recommendation #33: That the APEGBC work to establish recognition of Building Envelope Science as an important technical discipline and encourage members who practice in residential construction to upgrade their abilities accordingly.***

The Commission is aware that this recommendation is being implemented through the accreditation standards being developed as part of BEP.

> ***Recommendation #27: That the AIBC increase its efforts to work with APEGBC and other industry representatives to develop a common understanding and an agreed to strategy for ensuring quality building envelop design and review of construction through the Homeowner Protection Office's Research and Education initiative.***
>
> ***Recommendation #28: That standard forms of contract become compulsory between the architect and developer in multi-residential design.***
>
> ***Recommendation #29: General contractors or builders improve their communication with architects (or coordinating engineers) and the city inspectors, by informing each party as to the stage of construction.***
> ***Recommendation #30: Architects (and coordinating engineers) should be***

encouraged to use third-party inspection services and manufacturers' inspection services to augment their field reviews.

The Commission had envisioned Recommendations #27 - #30 would be fulfilled through the AIBC involvement with the HPO and the PAC. Unfortunately, the Memorandum of Understanding (MOU) between HPO and AIBC took many months to finalize and much valuable time and energy was spent focused on the MOU, instead of the content of these recommendations.

The Commission, although encouraged by the level of knowledge and understanding of the issues reflected in the presentation by the AIBC at the most recent hearings, is still concerned that architects and their regulatory body are not yet acknowledging their responsibility for the crisis nor working with sufficient vigour toward solution.

Recommendation #31: Homeowner Protection Act be structured to receive, as part of the funding for the proposed Education and Research function of the Homeowner Protection Office, an annual fee from each AIBC member of $1,000.

This recommendation was not implemented. Instead, the architects agreed to provide $250 per AIBC member to the HPO. This shortfall in funds helped to weaken the PAC and delay the work it should be doing.

The AIBC informed the Commission that their members were under pressure from developers to produce substandard work because fees were not high enough. The Commission understands the pressure builders bring to bear on all facets of the development process, including pressure on architects, however, AIBC needs to contribute a fair share to the solution.

On February 2, 2000, ENCON Insurance Managers, which provides professional liability insurance for about 70 percent of the architects and engineers in British Columbia, announced that *"effective February 1, 2000 ENCON have introduced policy amendments which will exclude coverage for claims arising out of the infiltration of precipitation on all multi-unit residential projects."*

Effectively, ENCON will no longer provide liability insurance in the event of a leaky condo. Professionals remain covered for the duration of an existing policy--1-2 years--but upon renewal, water penetration coverage is no longer available. Since the policies are provided on a claims-made basis, the change means that strata councils should take immediate steps to make claims against any insured architects or engineers.

ENCON's reasons for this change in coverage options were outlined in correspondence as follows:

The problem is not new, we have all been aware of it for several years, however in the last 12 months the magnitude of losses and potential losses has (sic) increased greatly. Eighteen months ago we had 69 Leaky Condo claims reported over 5 years and today we are facing over 200 such loss situations and the number is growing as each week passes.

III. Labour Force

I'm involved daily in inspections, I see daily what's going on in the market....Fish scaling, that's one of the old methods, and the true method, really to shut off water from a building. But it seems to me like in new construction, with the new materials we have on the market, that people think we don't have to do that anymore.

- Uwe Naumann, Building Inspector
October 4, 1999

An important element in the plan for the renewal of trust in residential construction is ensuring that qualified trades people are employed in the industry. Based on many submissions received by the Commission at its hearings in 1998, it became apparent that poor worker performance (including carpentry, roofing, glazing, and plastering) was a significant factor in building envelope failure.

Pride in producing safe, quality housing has given way, much too often, to the hiring of unskilled labour; cut throat competition, and underground cash economy; and too many occurrences of unreported, unethical practices. This situation is not the fault of workers; rather it is the developer or builder who is responsible for the skills of the people on the site. The effect of pressured work schedules, lack of regard for skills and training, and a desire to keep wages low, has led to a downgrading of the calibre of work. This situation reflects badly on the entire industry.

- Barrett Commission Report, June 16, 1998

Business, professional, and labour organizations expressed concern with this trend. All have supported a level playing field whereby housing construction operators--who play by the rules--are not placed at a competitive disadvantage, and tradespeople are not pressured into accepting less than adequate working arrangements and conditions. Furthermore, as noted in the first report, *"a declining skill base and deteriorating work habits are not a function of union versus non-union...training, qualification and certification does not require membership in a union."*

"Apprenticeship: A Construction Industry Perspective," (April 1997) was published by a task force, composed of employers in all facets of the construction industry, who strongly endorsed the position that *"compulsory certification of trades must be supported with appropriate compliance enforcement measures."* The Construction Industry Review Panel reported in 1998 that *"those contractors who presently abide by the rules are at a serious economic disadvantage when they*

have to compete with other employers who show a blatant disregard for this requirement."

The Commission, in its first report, made a number of recommendations related to subcontractor licensing, trades certification, apprenticeship training, and qualified trades enforcement on residential construction sites.

Regretfully, very little action has taken place. Evidence presented at the recent hearings, from strata councils, condo owners, municipal representatives, and labour organizations, indicates a continuation of poor trades practices. This is documented in the first Commission report. There is a deep concern that these same-poor quality construction practices are being repeated in the numerous repair and remediation activities associated with premature building envelope failures.

> *Having seen some of the players that are now involved in renovation work, coming onto a number of sites throughout the lower mainland, they employ the same level of lack of skilled workers that were originally on site. I think its reprehensible to see some of the development companies trying to...put the same people that are on site to correct the problems that...perhaps some of those workers contributed to directly in the first instance. They too should be covered by...regulations to ensure that they're trade qualified in order to do the work, whether its renovation work or whether its new construction.*
>
> *- Tom Sigurdson, Executive Director, BC & Yukon Building and Construction Trades Council*
> *December 2, 1999*

A. Enforcement of Qualified Trades

> *Architects, engineers, technicians, and inspectors must be registered and accredited. Why in the world are we not forcing contractors to use qualified trades persons? How does this contribute to the integrity of the safety systems and the public interest?*
>
> *- Wayne Peppard, United Association, Plumbing and Pipefitting*
> *October 14, 1999*

The Industry Training and Apprenticeship Act Regulations, Section 2, lists seven designated compulsory construction trades including electricians, plumbers, refrigeration mechanics, roofers[35], sheet metal workers, sprinkler system installers, and steamfitters-pipefitters.

A number of presenters informed the Commission about a lack of provincial and municipal enforcement procedures to ensure that, at least for the seven designated compulsory trades, certified workers were on site. This confirms what the Commission was told during the first set of hearings.

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[35] Roofers, as a compulsory trade, currently excludes those involved only in residential construction.

...today, we could go to any job site around the block here and find unqualified workers installing piping, work that should be done by qualified people, that is under the legislation right now.

- Steve Oakley, United Association, Plumbing and Pipefitting
October 14, 1999

I will list off a few of the locations where construction is now underway, completed....This is just a small sample of all these sites...where they are using, currently, or have used, unqualified electricians and an excess of untrained, unskilled and unsupervised apprentices.

- Dave Thompson, International Brotherhood of Electrical Workers
October 14, 1999

The Commission had recommended (#4, #34, and #37) that a system of inspection be designed whereby municipal inspectors and provincial inspectors under the HPO, enforce the employment of qualified building trades on site. A system of discipline was also recommended for employers who violate the requirement for qualified trades on residential construction sites.

Recommendation #4: That the administration and interpretation of the Building Code be enhanced through the creation of provincial inspectors capable of undertaking on-site inspections.

Recommendation #34: Immediate and definite steps be taken to ensure that all compulsory trades required by law to be on site in a residential project, be enforced.

Recommendation #37: That a system of inspection be designed whereby municipal inspectors and provincial inspectors, through the newly formed Homeowner Protection Office, enforce the employment of qualified building trades on site, and that a system of discipline be developed for employers violating the requirements for qualified trades on residential construction sites.

Section 19 of the *HPO Act*, provides HPO with the authority to ensure only qualified workers are on site. Section 9 provides the authority to enforce the requirement for on-site qualified workers. Section 34 authorizes the application of penalties for lack of compliance. The Commission had envisioned that a special team of inspectors within the HPO would perform a number of important functions including, but not limited to:

1. checking for certification of workers on site;
2. spot checking compliance with the Building Code (although compliance is a municipal responsibility, the Commission was very concerned about the lack of municipal inspections and lack of on-site discipline to ensure code compliance);
3. ensuring owner-builder status is legitimate; and
4. providing an information feedback loop to the HPO on standards of practice and performance.

The enforcement of qualified building trades on site could be undertaken by municipal inspectors. However, for a variety of reasons, spelled out in Chapter FIVE, Municipal Government, this is not likely to happen. The HPO needs to take the leadership role in inspection, enforcement, and discipline.

Until recently, no action on trade enforcement had been taken by the HPO. However, on January 20, 2000, a senior compliance officer was added to HPO's staff complement to ensure qualified trades are employed in the building process through on-site inspections. The Commission believes that enforcement should be a much higher priority among HPO activities and that this recent hiring should be a first step toward a small team of inspection and random auditing to change the current environment.

> ***Recommendation #36: That any developer, builder, general contractor, or sub-trade, who employ compulsory trades to work on a residential construction site, must file a report listing the names and trade qualifications of all certified and apprentice trades on the job, and that this list form part of the necessary documentation to be provided to future strata councils and homeowners.***

This Recommendation was put forward to assist in ensuring only qualified workers are on site as required by law, and that homeowners know who to contact in the event of a problem with their building . Employers under the *Homeowner Protection Act*, Section 19, and the Regulation 4 (i), have an obligation to employ in accordance with *The Industry Training and Apprenticeship Act* and, therefore, must employ only people who are qualified in particular trades, to work in those trades. However, this recommendation has yet to be accommodated in the regulations. The Commission is of the view that this recommendation be implemented and the list be filed with HPO.

B. Trades Designation

Automotive service technicians, automotive painters, and hair stylists are a number of the compulsory trade designations in British Columbia. As stated in the first Barrett Commission report, the skills related to those areas of expertise are appreciated.

> *What this Commission does not accept is that the trade skills in constructing a home--which is the most important investment decision most people ever make--are somehow less important than the mandatory skills related to auto repair and hair styling.*
>
> *- Barrett Commission Report, June 1998*

There are numerous recognized trades required for home building--especially the carpentry trade--which have provided the majority of foremen and site superintendents in residential construction. Among the larger, more populated provinces, British Columbia's designations are less than the compulsory designations in the provinces of Quebec, Alberta, and Ontario.

Quebec designates that trade qualification certification be compulsory for all construction trades. In Alberta, compulsory trades include almost all of the BC designations but also include boilermakers, crane operators, ironworkers, tilesetters, and welders. Ontario includes all of the BC designations (except sprinkler system installers) as well as mobile and tower crane operators.

The Commission noted in its first report that many had called for a system of trades training, qualification and compulsory certification for the residential building industry.

> *The provincial government should establish a system of subtrade registration and certification....[It] should take steps to strengthen the apprenticeship program for building trades in the province and establish a requirement for trades qualification in the building trades. The fact that many of the workers engaged in residential construction have no trades qualifications is a concern. The difficulty that design professionals have had in assuming quality construction is directly related to the lack of knowledge and skill in the industry.*
>
> *- Tom Timm, Chief Inspector, City of Vancouver*

This position was reinforced during the recent hearings, by Douglas Watts, Building Envelope Specialist, City of Vancouver.

> ***Recommendation #35: That the Homeowner Protection Legislation include the authority for the Homeowner Protection Office to recommend compulsory trade certification related to multi-family residential construction.***

The HPO Act, Section 19 (2), provides HPO with the authority to advise the provincial government to designate an occupation as a compulsory certification occupation, or a designated trade as a compulsory certification trade. To date, HPO has made no such recommendations.

C. Subcontractor Licensing

> ***Recommendation #22: That the residential construction industry be regulated under public authority through a Regulatory and Licensing arm of the Homeowner Protection Office.***

Recommendation #22 is incorporated in the *HPO Act*, Section 14. The Regulations, Section 32-2(e) allows for the regulation and licensing of sub contractors. It was the Commission's conclusion that an effective and qualified labour force required the registration and licensing of subcontractors, independent contractors, and renovation contractors.

In the absence of contractors being licensed and regulated, it is possible for non-qualified trades workers to continue dominating the residential construction workforce. Given the nature of the construction industry, the sub-tendering of bids (also known as bid shopping) removes developers and general contractors from those people actually doing the work. Without regulation, the market forces of a non-level playing field, especially in the construction industry, lead to an

underground economy. This drives non-qualified workers into the sub-trades, making it harder for qualified workers to be employed.

While renovation contractors will become licensed and regulated in the near term, the HPO has yet to develop an implementation plan for the licensing of residential sub contractors. Neither category should be unregulated because, as noted above, it encourages an underground economy and the employment of unqualified workers.

> *Provincial government, when they enacted the regulations, made a decision to defer the licensing of subcontractor issues. They would let the system run for--for a period of time, 12 to 18 months, monitor that situation and then determine whether subcontractor licensing was necessary, and then consider it at that time.*
>
> *-Shayne Ramsay, CEO, HPO*
> *December 7, 1999*

It is appreciated that the time constraints faced by HPO staff in formulating the regulations, would require that their first order of concern be vendor/developers and general contractors. Presumably, that is why the discussion paper, "Homeowner Protection Act - 1998: Proposed Implementation of Residential Builder Licensing and Warranty Provisions" stated, *"the issue of sub-contractor licensing, including the licensing of independent contractors and labour contractors will be considered in 1999."*

It is strongly recommended that HPO maintain a registry of building sub contractors and that this registry, like the vendor/builder or general contractor registry, be accessible to the public at all times. The matter of actual licensing, the fee for these licenses, and other relevant information, can be left for development over the course of this year. Furthermore, to easily administer the registration of residential building sub contractors, there could be a requirement that only those with annual gross revenues of over $30,000 register with the HPO, since this is the floor which establishes a GST registerable company.

The proposed definition for a sub contractor to be included in registration and licensing is:

> ***Residential building subcontractor: means a residential building subcontractor with gross revenue of $30,000 or more, that is engaged under contract by a developer/builder or general contractor to perform or cause to be performed part of the construction of a new home.***
>
> ***Residential building subcontractor registry: residential building sub-contractors shall submit the following information for the Homeowner Protection Office registry:***
>
> ***i) the name of the subcontractor, address, postal code, phone, fax and e-mail address;***
>
> ***ii) if the applicant is a corporation, the name of a director nominee of the corporation who agrees to act as a representative of the corporation and in whose name the registry will list;***

iii) the names of each principal, partner, director, and officer of the applicant; and

iv) the nature of the work to be performed as part of the construction of a new home.

It is recognized that detailed regulations have been formulated to provide guidance for warranty providers in obtaining the proper information to assess the risks and related costs involved in warranty coverage required on residential construction. However, warranty coverage is neither a substitute nor a protective umbrella for ensuring that qualified work is undertaken.

Warranty companies have neither the authority, skills, nor resources to guarantee qualified work takes place. They do not regulate sub contractors involved in residential construction and they are not in a position to ensure qualified trades undertake the work they are supposed to undertake; just as building inspectors are not in a position to guarantee the quality of work on site. Given the mandatory warranty standards now being required, the continuation of poor quality residential construction by unregulated sub contractors will result, later on, in high renovation costs and higher premiums imposed by warranty companies.

The regulation of sub contractors is an important element in ensuring a level playing field for the industry. It also provides a minimum standard of performance which will assist all developers and general contractors by providing the certainty that poor quality work, often at reduced prices, is not being undertaken and, thereby, undermining the ability of integrious companies to compete in the market place.

D. Worker Training

Developing the necessary skills and abilities of those involved in the residential construction industry is the central theme of the Commission's work. Education, training, technology transfer, due care and attention, understanding the building science, understanding on-site techniques, understanding the building code--these are requirements that appear time and time again. This industry has paid the price of ignorance.

> *...it appears that maintaining high standard of quality and passing the necessary skills and work habits onto the next generation has become a relic of the past. The commitment to train young people in trades, as part of an apprenticeship-based method, has given way to developers and builders, using apprentices as cheap labour. There is little intention of ensuring the training is completed and journeyperson status is achieved.*
>
> *-Barrett Commission Report, June 1998, page 40.*

At the recent hearings the Commission heard testimony related to the hiring of non-registered apprentices whose wage rates are significantly lower than a journeypersons wage rates and which represent lower costs to any unscrupulous contractor.

Ideally there should be 3 or 4 journeypeople to each apprentice. This is because journeypersons have specialized expertise in one area of the trade over another. Allowing an apprentice to resource the experience and specialized expertise of a number of journeypeople gives the apprentice a more rounded training experience.

- Tom Sigurdson, Executive Director, BC & Yukon Building and Construction Trades Council
December 2, 1999

The Commission recommends that the provincial government through the Industry Trade Apprenticeship Commission (ITAC) tighten up on apprenticeship ratios to offer the best training possible to residential construction workers. Related to this area is the requirement for a proper and effective trades training system.

We still install residential window systems, but not on the scale that we used to....We used to have several contractors who installed residential window systems. Everyone of them employed TQ journeypersons and registered apprentices. The tradesmen installing the windows had learned the proper procedures involved in their craft over the years, and passed their knowledge onto the young people apprenticing under them. The end result was a quality leak-free installation, and an apprentice gaining experience and knowledge.

We now have only one contractor who specializes in the high-rise residential new construction market....[They] can now no longer compete with the large eastern contractors who have come to town, or the local fly-by-nighters. They hire the bulk of their crews through labour brokers, such as Labour Ready, or right off the street with little or no experience in glazing. The turnover in the crews is a constant problem.

- Pat Byrne, Glaziers Union
December 2, 1999

The above is particularly disturbing given the fact that the Commission has heard numerous presenters point to the problems with windows and window installation as a major contributor to the leaky condo problem.

The unfortunate reality we've observed in the last number of years out in the construction industry is that, as skilled professionals retire, there is not really an influx of new members who have significant training following them into the construction industry....There was a group of Portuguese cement finishers (who worked on the new library downtown) who, frankly, have been around town for a long time, are some of the best cement finishers in town, doing the work on that project. My fear is, when they retire, we won't have the same skill of concrete finishing available in the city of Vancouver. Frankly, we've had waves of immigration that brought in significant skills and trades into the province, and our training programs, I don't think, have done service for us in providing those

skilled trades to be available in the construction industry....When more of those tradesmen who really have the real solid skills behind them retire, we're going to be in significant trouble in terms of construction, and I think there is a real need for further trades education programs.

- Doug Watts, Building Envelope Specialist, City of Vancouver
November 16, 1999

Given recent cutbacks in this area, both industry and labour representatives expressed deep concern about the lack of provincial government financial support. The Commission urged, in recommendation #6, that the provincial government through ITAC, allocate sufficient resources for training and apprenticeship programs, in association with business and labour in the residential construction industry. Regretfully, this recommendation has not been implemented. The Commission again urges the adoption of this recommendation.

Recommendation #6: That the provincial government allocate sufficient resources for training and apprenticeship programs, in association with business and labour in the residential construction industry, through the Industry Trade Apprenticeship Commission (ITAC).

Part II - Volume II Recommendation #3: That the provincial government through the Industry Trade Apprenticeship Commission (ITAC) tighten up on apprenticeship ratios to offer the best training possible to residential construction workers. Related to this area is the requirement for a proper and effective trades training system.

IV. Financial Institutions

It was noted in the first Commission's report that there were numerous oral and written presentations from condo owners and strata councils stating that financial institutions were unresponsive and insensitive to their needs. As the recommendations in the first report assisted financially burdened homeowners and substantially improved residential real estate market conditions, financial institutions become the direct beneficiaries. Not only are mortgage defaults and bankruptcies mitigated, commercial loans to developers increase in a return to healthy real estate market conditions.

Accordingly, the Commission had recommended that there be a nominal contribution from financial institutions. In response to a request for the funding from the Minister of Municipal Affairs, the financial institutions declined to provide any financial support to the Reconstruction Fund.

Recommendation #51: Financial Institutions operating in BC be requested to contribute, on a pro rata basis, based on their residential mortgage portfolio, $10 million to the Reconstruction Fund.

A. Reconstruction Fund Benefits

Although requested by the Commission, both the chartered banks, through the Canadian Bankers Association (CBA) and the credit unions through Central Credit Union of British Columbia (CCUBC), declined to appear before the inquiry. They had also declined a request to present during the first Commission of Inquiry.

> *Our efforts to deal with individuals on a one-to-one basis in a compassionate way has been described in some detail in two written submissions and we therefore remain of the opinion that there would be little purpose served in making a verbal presentation.*
>
> *- Paul Griffen, Canadian Bankers Association*
> *December 8, 1999.*

The banks and credit unions' reluctance to come forward and discuss the condominium crisis with the Commission has insulated them from the problem. Surprisingly, the credit unions, who pride themselves on their community involvement and commitment have been just as reluctant as the banks to take a leadership role in ensuring foreclosures are minimized. The following table summarizes approved loans by financial institution.

Benefits to Financial Institutions
As of January 31, 2000

Table 9

Financial Institution	Total Loans	HPO Loan Amount	Total Existing Mortgages
Royal Bank	205	$4,116,000	$21,973,000
Vancity Savings	170	$3,209,000	$17,582,000
Toronto Dominion	158	$3,056,000	$16,722,000
Bank of Nova Scotia	153	$2,832,000	$16,205,000
Canada Trusco	140	$2,483,000	$14,359,000
Bank of Montreal	132	$2,399,000	$13,422,000
HSBC	75	$1,247,000	$ 7,262,000
Surrey Metro Savings	39	$ 714,000	$ 4,043,000
Richmond Savings	33	$ 538,000	$ 3,447,000
First Heritage	26	$ 545,000	$ 2,748,000
National Trust	25	$ 542,000	$ 2,471,000
All others	427	$ 7,902,000	$ 44,409,000
Total	**1,583**	**$29,583,000**	**$164,643,000**

Source: HPO

The Reconstruction Fund has benefited financial institutions who hold the first mortgage on condominiums with building envelope failure. As of January 31, 2000, the HPO has approved a

total of 1,897 loans for approximately $36 million, representing $179 million in existing mortgage loans (prior to repair mortgages). These loans would likely have represented foreclosures, if the HPO financing had not been made available. Thirty-seven percent of mortgages are non-insured and, therefore are held by financial institutions.

Without the provincial Reconstruction Loan Fund, financial institutions would have been negatively impacted in the amount $47.5 million in terms of a drain on cash flow, and an actual financial loss due to foreclosures of about $23.8 million--a direct write off on their balance sheets.[36]

Since there are financial institutions, other than banks and credit unions, who hold mortgages for leaky condos, in aggregate 1,583 non-insured loans have been made. In the absence of the Reconstruction Fund, this represents a cash flow loss to private sector financial institutions of approximately $61 million and a real loss of close to $30.5 million.

Part II - Volume II Recommendation #4: That the provincial government bring in adjustments to the Corporation Capital Tax Act so that a dedicated revenue amount of $30 million ($10 million per year over three years) be obtained from financial institutions for financing the Research and Education activities of the HPO. It is further recommended that this fund be used as a capital fund and the interest earned each year be allocated to research and education as set forth by the Provincial Advisory Council.

B. RRSPs

In the first Commission's report, recommendations were made which would assist homeowners who had no recourse in financing their special assessments other than the liquidation of their RRSPs.

Recommendation #75: The same rules as apply for use of RRSP funds for the down payment of a home apply for any homeowners, resident in BC, who wants to undertake repairs. This would mean that an individual and spouse could withdraw up to $20,000 each without penalty, to be repaid within 15 years on a schedule of at least 1/15 per year.

Recommendation #76: The rules respecting the use of RRSP be applied retroactively for any taxpayer who has withdrawn RRSP funds to effect repairs under a special assessment. The taxpayer would apply for their income tax rebate in their 1998 tax return, which would be equivalent to the taxes they paid for withdrawals related to homeowner repairs or renovations in their taxable income.

[36] This assumes a net decline in the value of the property of 50 percent of the mortgage amount.

While there was no response from Revenue Canada or CMHC, the Commission, upon reconvening, explored the availability of self-directed mortgages which allow homeowners to borrow their own funds for home repairs.

Commission staff inquired at local banks and credit unions and discovered that:

a) financial institution staff did not know very much about this product; and
b) when they did know about the product, it was actively discouraged.

It was claimed by CBA and CCUBC that this option was complex and costly. For example in a letter from Mr. Paul Griffen, CBA, on December 8, 1999, it was explained that a self-directed mortgages:

> *requires a level of financial maturity on the part of the client and there are strict guidelines concerning the remaining equity position in the subject property...one estimate puts the break-even point in the $60,0000 range....Most customer do not have sufficient funds to justify the expense.*

The information from the financial institutions is misleading. It represents a lack of knowledge concerning what the besieged condo owner is facing when required to pay a special levy. The following analysis was presented, on November 3, 1999, in questioning CMHC.

> *If I have a $20,000 special assessment, and I have to go to my bank to get a personal loan at 9 percent , and pay for that out of after-tax dollars, that's one thing....But most people are looking at liquidating their RRSPs....So we're facing a situation where a consumer may only have an RRSP for $30,000, and not knowing about this product, liquidated $20,000, paid a 50-percent tax rate on it, and now has no opportunity to put that money back into their retirement savings....Wouldn't it be incumbent upon the banks, and in fact CMHC, to help identify this for consumers?*

The Commission made other consumer support recommendations in its first report, as well as financial support recommendations in Part II, Volume I.

> ***Recommendation #46: That financial institutions, or CMHC, provide to the borrower, a complete copy of any appraisal or inspection conducted in the process of obtaining mortgage loan approval.***

In the event that the financial institution does undertake to have an appraisal done, the consumer should be given a copy of that appraisal. It is not known precisely which financial institutions, as a matter of policy, make available appraisals to their clients. An exploratory phone call to the Royal Bank revealed that the Royal has a stated policy, brought in within the past year that, if requested, an appraisal would be made available to the client. A similar call to Central Credit Union of British Columbia revealed that Credit Unions, as a matter of policy, do not make

appraisals available to the homeowner. Exploratory requests regarding the approach would be necessary to determine the practice conducted by each institution.

V. CMHC

Canada Mortgage and Housing Corporation (CMHC) is the federal government's housing agency and a crown corporation providing mortgage loan insurance, assisted home ownership, research and information transfer. In its 1998 annual report, the Chairman, Mr. Peter Smith said:

> *CMHC is involved in many different types of activity, from ensuring access to mortgage financing to supporting assisted housing, to researching the housing technologies that will shape the living environments of tomorrow. In these and other areas, CMHC touches the lives of hundreds of thousands of Canadians every year. The ability of the Board of Directors to provide good corporate governance is critical to CMHC's ability to carry out its mission successfully. Effective stewardship of our crown corporation inspires the trust of our partners in the housing industry and the confidence of Canadians who rely on us to help them realize their dreams of home ownership. Good governance is a responsibility we have not only to the Government of Canada, but also to the homebuyers, housing professionals and other clients we serve every day. It is a responsibility we take seriously.*

The Commission has received numerous presentations and submissions from Strata Councils and individual homeowners stating emphatically that the governance and fiduciary responsibility referred to in Chairman Smith's statement, has failed when applied to multi-family residential construction in British Columbia. This has been further aggravated by the unique relationship between CMHC and NHW, and a lack of stewardship by CMHC in ensuring that the home warranty company they mandated was a viable and prudent warranty company.

> *The federal government, through CMHC, has been offering financial incentives to first time buyers to enter the market. These incentives included borrowing down payment funds from RRSPs, and high-ratio mortgage insurance. For a fee, CMHC has been insuring the high-ratio portion of a mortgage to financial institutions. It is the nature of the requirements for CMHC approval that contribute to the crisis precipitated by the NHW receivership. In order to qualify for CMHC insurance on a new building, a first time buyer was required to purchase in a development, insured by an approved warranty provider. To the best of our knowledge, the only acceptable provider to CMHC was NHW. CMHC would not approve the purchase of a property insured by the developer or another provider.*
>
> *In essence, the position of CMHC in this matter forced many new owners into a business relationship with a company (NHW) that ultimately proved insolvent.*

Since, in many cases, the actions of CMHC mandated our choice as owners, they have created a liability to which they have not responded.

- Brent White, Strata Corporation Chair, Michael Vizsoli, Vice-Chair
Beverly Gardens, LMS 2332
September 21, 1999

In the Commission's first report, it was noted that CMHC had played a very important consumer protection role in enforcing quality housing construction in the 1960s and 1970s. By the early 1980s, that had changed. CMHC's primary role became that of a mortgage insurer for residential ownership. The beneficiary of CMHC's high-ratio mortgages were homeowners, as well as financial institutions. In return for a premium from the homebuyer, CMHC agreed to protect the bank, credit union, trust company, or other qualified financial institution against borrower default. These financial institutions could then provide mortgages to people purchasing homes with no more than a 5 percent down payment--compared to the 25 percent down payment required by law. For BC this expanded the multi-unit residential market, particularly for young families starting out, or for senior citizens on fixed pensions.

Certain areas of our business operate on a more commercial basis, most notably our mortgage insurance business. However, even within this area of our business, there are public policy considerations as we are mandated by the federal government to provide mortgage insurance to all Canadians at the same rates across Canada. CMHC sets its fees and premiums and pools its risk on a national basis to ensure that each of its mortgage insurance products are viable and that the Mortgage Insurance Fund (MIF) is self-sustaining.

- Jim Lynch, General Manager in British Columbia, CMHC
November 3, 1999

CMHC's public interest role has been seriously eroded as its commercial activities have been advanced--especially in the area of consumer protection. There is no question that CMHC has played a leading role in identifying the causes and finding solutions to moisture damage in condominiums in the coastal climate of BC. Its studies and technical papers, developed in response to moisture penetration, are well appreciated. Some of the research includes:

The Survey of Building Envelope Failures in the Coastal Climate of British Columbia: 1996
Best Practices Guide: Wood Frame Envelopes in the Coastal Climate of British Columbia: 1998
Managing Major Repairs: A Condominium Owners Manual (with HPO and Ministry of Municipal Affairs): 1999

However, it is suggested that CMHC has failed--either through a lack of corporate governance or benign neglect--to be a stronger advocate for homebuyers in the coastal climate of British Columbia.

The response from both the federal government and CMHC on recommendation #75 and #76, regarding the use of RRSP funds for repairs, was silence. However, as explained above, CMHC and Revenue Canada already had in place RRSP self-directed mortgages with CMHC insurance, allowing homeowners to borrow their own RRSP funds for home repairs.

In fact, after the Commission was reconvened in 1999, this matter was brought to the attention of CMHC by Commission staff. Vague responses were initially received about uncertainty as to whether leaky condo repairs would qualify. After considerable research and further inquiries by the Commission, it was determined that any BC homeowner could have borrowed funds from their RRSP for purposes of home repairs, without affecting their non-taxable status, as long as the mortgage was insured by CMHC.

However, after a number of visits by Commission staff to local chartered banks and credit unions, it was discovered that financial institutions' staff did not know about this option or, if they did, the product (a self-administered RRSP mortgage used for the purpose of home repairs, with CMHC insurance) was being actively discouraged under the claim that the fees and appraisal costs (about $1,000) rendered this option non-competitive. Obviously, when a homeowner is facing a $30,000 assessment, which must be paid out of after-tax dollars as compared to accessing their pre-tax RRSP funds, which they can pay back to themselves at market rates of interest, the cost-benefit is apparent. At no time did the federal government, CMHC, or financial institutions consider it desirable to make this information known or easily accessible.

Because homeowners were unaware of this program, a number exhausted their existing RRSP funds and paid income taxes accordingly, violating the Commission's principle that government should not be seen to benefit from the affects of this tragedy. When Mr. Jim Lynch, CMHC General Manager for BC and the Yukon, testified before the Commission on November 3, 1999, the following exchange took place during the question period:

> ***Ms. Allan:*** *But this other product has existed for some time, and certainly within the last year. Was there any reason why CMHC didn't feel that it would be helpful to condominium owners to advertise this product. Because the banks certainly aren't doing it.*
> ***Mr. Lynch:*** *No*
> ***Ms. Allan:*** *No regulations, no laws have to change, and we know of many homeowners who have liquidated their RRSPs, paid very high taxes to the federal and provincial government , and now have no retirement savings, and they could have had a self-directed mortgage.*
> ***Mr. Lynch:*** *Well, the information on the program is available ---*
> ***Ms. Allan:*** *Where?*
> ***Mr. Lynch:*** *You're suggesting that it should be promoted more. I'll take that advice. The --- I guess the judgment, and it could have been incorrect, that there would not be a large take-up of individuals who are in the circumstance of having large RRSP accounts that in fact would want to see it in a self-directed RRSP. They'd like to see their money doing better work for them in other investment vehicles.*

Ms. Allan: *Let's just look at the numbers, okay?, and I can understand if the marketplace take-up was low, but there weren't these kinds of repairs needed before. The environment is different. But let's just take an analysis. If I have a $20,000 special assessment, and I have to go to my bank and get a personal loan at 9 per cent, and pay for that out of after-tax dollars, that's one thing. That's a certain cost. But most of the people that are looking at liquidating their RRSPs have exhausted those avenues. So we're facing a situation where a consumer may only have an RRSP for $30,000, and not knowing about this product, liquidated $20,000, paid a 50 per cent tax rate on it, and now has no opportunity to put that money back into their retirement savings. There's a serious situation of a very different market environment for all these homeowners, and if even 20 per cent of them are faced with this opportunity, wouldn't it be incumbent upon the banks, and in fact CMHC, to help identify this for consumers? Because if you're working with your mortgage-insured consumers on trying to provide the best extension of their loans, and you're looking at market rate, why wouldn't that other opportunity also be provided to them, as a way to avoid expensive borrowings?*

Mr. Lynch: *Well, the product was available, and the product---*

Ms. Allan: *Was not advertised.*

Mr. Lynch: *It was not advertised.*

It is useful to note that, when severe flooding devastated some regions in southern Manitoba in the Spring of 1997, and severe ice storms impacted residents of eastern Ontario, Quebec, New Brunswick, and Nova Scotia in January 1998, Revenue Canada made tax concessions and provided background information on tax matters to assist those victims of the disasters.

> *In an effort to assist Canadians in areas affected by the ice storm, and in the interest of fairness and flexibility, Revenue Canada is offering relief to those taxpayers who received financial assistance to help them through their period of hardship.*[37]

> *When disaster strikes, the federal government provides assistance to the provinces through the Disaster Financial Assistance Arrangements when the cost of dealing with the disaster would otherwise place an undue burden on the provincial economy. In general when victims of a disaster receive payments from the government for personal losses, these payments are not taxable.* [38]

No such information was made available by Revenue Canada to leaky condo owners in British Columbia.

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[37] Press Release, Revenue Canada, Federal tax relief for 1998 ice storm victims, March 11, 1999.

[38] Ibid., Taxation of Financial Assistance to Manitoba Flood Victims, June 17, 1997.

A. CMHC and NHW

NHW had as its sole shareholder CHBA-BC. CMHC maintains that this structure was an acceptable "arms-length" relationship for CMHC mortgage loan insurance policies. Thus, NHW was given a monopoly position (effectively, until 1996) by CMHC, mandating all prospective high-ratio mortgage purchasers to utilize home warranty provided by NHW. If this "arms-length" structure was acceptable then, at minimum, there was some obligation by CMHC to ensure that their mandated company was a prudent insurance company with proper underwriting and reserve practices.

Once CMHC deemed these companies were important instruments for their mortgage loan insurance policies, it fell upon CMHC to ensure that the product they required, was a good and reliable product.

It is alarming that, despite the mounting evidence and information regarding NHW's claims handling practices, brought forward during the Commission's first hearings, CMHC undertook no action to ensure NHW was fulfilling its responsibilities as an approved warranty provider.

Reviewing the Minutes of NHW from 1976, the Commission has found that, without CMHC's support, there would not have been builder/association-run home warranty companies across the country.

> *As you are all no doubt aware, the Federal Minister responsible for housing, Mr. Oullette, announced, during the HUDAC [now CHBA-BC] National Convention in Quebec City, that all CMHC loans for housing for sale units, must be covered by Warranty, as of July 1, 1978. In actual fact, I believe it is safe to say, that within BC at the present time, CMHC is requiring a builder to be registered with the Warranty Program, in order to secure funds.*
>
> *The positive impact of this move will be recognized in a marked increase in builder registrations and home enrollments.*[39]

Although there was a proposal by CMHC that the Warranty Board of Directors should comprise 25 percent non-builders, this never took place.

> *While considerable credit can be attributed to the Company's very aggressive marketing program, it must also be acknowledged, with the suspension of business order served on the Mortgage Insurance Company of Canada by the Federal Superintendent of Financial Institutions, this action has created a monopoly for CMHC. CMHC is responsible for administration of the National Housing Act which specifically requires warranty on residences financed through the National Housing Act*[40].

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[39] NHW Report to the Board, M. Manson, Chairman, HUDAC BC Council, March 1978, Appendix A - P1.
[40] NHW, Board Minutes, October 29, 1993, page 3.

The protected, and somewhat guaranteed, market NHW enjoyed continued until 1994. It was noted in the Board Minutes that:

> *CMHC is under review by the Federal Ministry of Industry for what is being perceived as a monopolistic practice in endorsing only the New Home Warranty Programs that currently exist.*[41]

> *Pafco Insurance Company has requested under the National Housing Act to provide new home warranty coverage. This request has been under debate for approximately 3 years and when denied Pafco applied to a higher constitutional authority. it is now clear that CMHC has no constitutional authority to preclude Pafco, or any other insurance company, from providing warranty coverage in a competitive market place.*[42]

This brief historical account shows quite clearly that CMHC protected NHW from any competitive pressures for nearly 20 of its 24 years of existence. For CMHC to now walk away and claim "we had nothing to do with NHW" is not consistent with the facts. CMHC should have ensured that the warranty company that they protected and encouraged had proper underwriting practices; adequate reserves; adequate inspections; fee schedule based upon risk; and fee increases that would ensure the company remained solvent.

B. CMHC and Developer Contract Violations

When NHW declared insolvency, CMHC sent out a press release on April 16, 1999, announcing that warranty replacement coverage for CMHC mortgage loan insurance would be required for those multi-unit residential buildings initially covered by NHW. However, when GE Capital, CMHC's competitor in this area, made an announcement that they were not going to require replacement warranty for pre-approved buildings, CMHC reversed its position.

> *The fact of the matter is that we were intending to ask for replacement warranty, but when finding out our competitor was taking a different position, which would affect market share, we made a corporate decision that we would match their requirement.*
>
> *- Jim Lynch, General Manager for BC, CMHC*
> *November 3, 1999*

CMHC's position on this is puzzling. There is no real competition in this area. A duopoly exists because there are only two companies offering mortgage insurance, with CMHC still maintaining the major share of the market. CMHC felt it had to provide lower-quality consumer protection because of a concern over loss of market share. CMHC did nothing to assist homeowners who had purchased because they valued warranty coverage, and when it was no longer available, wished to void their purchase contract.

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[41] NHW, Board Minutes, November 15/16, 1994, page 3.
[42] NHW, Board Minutes, March 30, 1995, page 2.

I was extremely concerned about the leaky condominium crisis when I chose to purchase my condominium. I wanted to make sure that the condominium I chose had sufficient third-party warranty coverage. On April 9, 1998, I purchased a preconstruction condominium from Aragon Properties Limited. The condominium was scheduled for occupancy in early 1999. I chose this particular condominium based on the fact that the developer offered a ten-year extended warranty through the New Home Warranty Program, instead of the usual five that was offered elsewhere. With the New Home Warranty Program collapse, the developer agreed to replace the New Home Warranty Program with another third-party warranty insurer called the National Home Warranty Program. Just days before I was expecting to close on the sale of my condominium, I received a letter from a Mr. Tomlinsen, a lawyer who was acting as the closing agent for the parties concerned. In his letter [it was] stated that a third-party warranty insurer would not be available upon closing.

In another bizarre twist to the story, the Canada Housing and Mortgage Corporation decided, when the New Home Warranty Program declared bankruptcy, to relax their usual requirement that all high-ratio mortgages be insured by a third-party warranty insurer.

This unilateral decision by CMHC allows the banks to go ahead and issue high-ratio mortgages and left mortgagors, like myself, without a third-party warranty insurer for their mortgages.

Today I am faced with mounting legal costs in an attempt to get my money back from the developer who promised a replacement third-party warranty and has demanded that I move into my condominium without one.

- Finn Ohrling, Condo Purchaser
October 5, 1999

The above matter provoked the following exchange between the Commissioner and Mr. Lynch during Mr. Lynch's testimony.

Mr. Barrett: *Now, I don't want to be judgmental, but I'm a little bit concerned about whether or not you've forgotten your consumer protection mandate....I listened very closely, and I'm not sure, but if indeed you did send a bulletin out, warning the product would not be insured because of that gap at the close of New Home Warranty, and the private competitor said, "Well, we'll disabuse ourselves of any concern of that,." and you then dismissed your own warning letter and said, "Well, we'd better meet the private competition." But you're a Crown Corporation, and you've got a consumer protection mandate. I don't understand how you reach from one to the other.*

Mr. Lynch: *...this issue of consumer protection...has a whole bunch of issues around this, that we have to make decisions on....I can perfectly well see how*

some would see that as not protecting the consumer..
Mr. Barrett: *...Now, I don't know, but I'm worried, what happened to the consumer protection role of CMHC?*

C. CMHC and Foreclosures

CMHC said that it has not undertaken any analysis regarding the potential repair problem of multi-family residential buildings in BC. Given CMHC's exposure to the leaky condo problem, the lack of analysis is surprising. CMHC holds the mortgage insurance for 30 - 40 percent of the multi-unit residential market. About 70 percent of the people with high-ratio financing did so because they could not afford a greater down payment--they did not have equity. As a result, CMHC is likely to experience the impact of a large number of homeowners who are unable to pay their assessments and, consequently declare bankruptcy or trigger foreclosure.

As noted in the Commission's report, Part II, Volume I, the provincial Reconstruction Loan Program has bailed out the banks, credit unions, and CMHC. Because the loan fund represents the "last resort" for applicants, nearly all would have defaulted on their existing home mortgage, if the fund was not available. Consequently, it has been estimated that, in the absence of the Reconstruction Program, the number of foreclosures and/or bankruptcies, would have increased by about 2,500 during the past year. The estimated savings, because those bankruptcies did not occur, is about $140 million--most of which is a direct benefit to the financial institutions and CMHC. Since 63 percent of all HPO loans are to homeowners with CMHC- insured mortgages, CMHC has benefited by about $90 million.

NHW's acting CEO and Chairman, Jim Thomson, wrote to CMHC on May 26, 1999, alerting the Corporation to the exposure arising from NHW's failure and recommending that CMHC contribute to the cost of repairs arising from faulty condominiums as a means of avoiding numerous foreclosures and bankruptcies. NHW estimated the cost of each foreclosure at $65,500. NHW did not receive a reply to its letter.

D. CMHC and CHBA-BC

The Commission became aware that Mr. Jeff Loucks, a senior manager with CMHC, was a Board member of CHBA-BC and a member of the Executive Committee. Questions were raised of Mr. Jim Lynch regarding CMHC's possible knowledge of NHW's operations, activities, and financial position. Mr. Lynch informed the Commission that Mr. Loucks was not on the Board as a result of his employment at CMHC.

Mr. Loucks, CMHC Manager of Home Ownership Insurance Products confirmed that he joined the board of Directors of CHBA-BC in October 1997, was a member of the Executive Committee and performed in the capacity of Secretary/Treasurer, then as Secretary.

Mr. Loucks maintains that he sits on the CHBA-BC Board in a personal capacity, even though he

is identified in CHBA-BC minutes as a representative of CMHC, and CMHC pays the CHBA-BC membership dues which allow Mr. Louks to be on the Board. Mr. Lynch approved of Mr. Loucks' appointment when he was invited by CHBA-BC to become a Board member, but also informed the Commission that Mr. Loucks was there in a personal capacity, and that most of the meetings were held in the evenings. Mr. Lynch also assured the Commission that Mr. Loucks withdrew himself, with respect to certain items, so as to not engage in any potential issues of conflict.

Following a review of CHBA-BC Minutes, it is clear that Mr. Loucks did not excuse himself from any discussions at the CHBA-BC Board or Executive Committee meetings (which took place mainly during the day). Mr. Loucks provided CHBA-BC with information regarding CMHC activities and policy, and was actively involved in all issues of CHBA-BC business, including presentations by Mr. David Verge, CEO of NHW.

E. CMHC and Co-operatives

The Commission received a number of presentations from co-operative housing owners whose building have been subject to the same kind of premature building envelope leaks that strata corporations have faced, except that the repairs required seem to be more extensive and hence, more expensive, than strata buildings.

Co-op housing had been supported by CMHC, as the federal government housing agency, but differs from rental housing in that members are not charged more than 25 to 30 percent of their income for housing. However, to cover the cost of repairs, co-op members have had to apply for second- and third-mortgages. As mortgage payments increase, the federal subsidy for low-income residents remains the same, resulting in cash-strapped residents having to vacate the building. The social make-up of the buildings is changing, since suites have to be rented to those who can afford them.

The Commission has heard testimony that CMHC delayed renovations in some CMHC social housing buildings. Ms. Shirley Hunter, Kitsilano Terrace Housing Co-op Chair, spoke to the Commission on November 15, 1999.

> ***Ms. Allan:*** *Did the City Health Inspector come out and look at the building?*
> ***Ms. Hunter:*** *...he did come out once. He said the recourse at the time was to condemn the suites.*
> ***Ms. Allan:*** *To condemn the suites?*
> ***Ms. Hunter:*** *Yes. In fact two of them were vacant...just before we retained the second mortgage. Two of them were so badly filled with mould and water, they were empty for seven months each, and the--of course we had no revenue from this. And that's why we had to wait a whole year for our second mortgage. CMHC said we couldn't have a second mortgage and then finally when they came out and saw--we had the Health Inspector and they saw the two suites were uninhabitable for seven months, they finally approved our second mortgage.*

Arising from recommendations in the first Barrett Commission report, this particular co-op applied for and was granted a 10-year, interest-free loan from HPO. Unfortunately, CMHC as the holder of the mortgage on the building needed to approve the arrangement.

> *We have been waiting patiently since August when the Vancouver office of CMHC cleared all our paperwork, they were satisfied with our financial projections, and that we could carry a third mortgage. As you can understand, being a housing co-op, third mortgages--this third mortgage is really hurting us, and as you can tell by the increasing over the years and the levy, this has hurt us greatly.*
>
> *From 1998--1999 we've had 12 more housing vacancies, and we already received this week another notice that another person will be vacating, again due to the wet.*
>
> *We were hoping, because the papers went to Ottawa in August, that we could probably start October the 1st. Because of the delay, the suites that are wet, are getting wetter. We did put tarps on two of the worst suites....As I say, we've been delayed. We can't possibly even tender the contracts, which will take us another six weeks, because we are waiting for this approval. We are on weekly contact with CMHC, and all they keep saying is the "papers are in Ottawa, the papers are in Ottawa."*
>
> *- Shirley Hunter, Co-op Chair*
> *November 15, 1999*

Similar experiences with attempts to repair their buildings have been related to the Commission by other co-operative representatives.

> *Over two-and-a-half years, trying to deal with CMHC practically to get this work-out agreement, we have felt unreasonably stymied and delayed by them.*
>
> *- Richard Halliday, Co-op Member*
> *December 2, 1999*

The Commission has been informed that although a Letter of Intent was signed with CMHC on January 26, 2000, to allow repairs to commence, Kitsilano Terrace is still awaiting final approval from CMHC in Ottawa. Other co-operatives are in a similar situation.

Chapter FIVE

Government

I. Federal

Widespread building envelope failures in British Columbia represent a catastrophic disaster resulting in serious harm to the health, safety and welfare of up to 50,000 families. The Commission heard compelling testimony suggesting a crisis of unprecedented proportions.

While the emotional and physical costs arising from this disaster cannot be erased, the Commission recommended a Compensation Plan in Part II, Volume I--involving the federal government--to demonstrate that Canadian and BC societies are not walking away from these victims.

> ***Recommendation #47: It is imperative that the federal government and CMHC provide a significant contribution toward homeowners who have been hurt by this crisis of quality, not only to alleviate the threat of bankruptcy for individual homeowners, but also to protect the solvency of CMHC, and the stability in the residential housing market of British Columbia.***

A Reconstruction Loan Fund has been established by the provincial government and is funded through a levy of $750 per unit on new residential construction in the coastal climate of British Columbia, with $75 million in bridge financing from the provincial government. The federal government offered a $75 million bridge financing loan for the Reconstruction Fund, but since it carried an interest rate higher than the provincial borrowing rate in capital markets, the province rejected the proposal.

As well as the above, the Commission also recommended it its first report that:

> ***Recommendation #77: Since the treatment of homeowners, who rent their units, is different from homeowners who live in their units, it is imperative that the cost of all qualified repairs be deducted from income. The application of this exemption would be retroactive and, as such, would provide a cost carry-back and carry-forward for homeowners. The application of this recommendation requires federal and provincial government approvals and, as such, is a cost-shared, tax expenditure.***
>
> ***Recommendation #79: For purposes of reconstruction, all GST and PST, payable on qualified repairs ad renovations, should be repealed. In this way, the owner/occupier is treated by taxation the same way as the owner/landlord.***
>
> ***Recommendation #80: All GST and PST that has been paid on renovations should be refunded to homeowners.***

The federal government has rejected all of the Commission's recommendations on providing tax relief for those affected by the repair costs of their water-damaged home. The Minister Responsible for CMHC, Mr. Gagliano, in his news release on November 17, 1998 and letter to the Minister of Municipal Affairs of BC on November 27, 1998, stated:

> *The Government of Canada is of the view that provision of federal tax relief would raise serious equity and administrative issues. Furthermore, allowing owners of water-damaged homes in BC to deduct the costs of repair for income tax purposes and exempt from the GST would be unfair to other homeowners whose homes may also be in need of repair but who would be denied similar exemptions. The Government of Canada must be mindful of fairness to all Canadian taxpayers.*
>
> *- CMHC Letter to the Commission*
> *October 4, 1999*

In response to one BC homeowner, the federal Minister of Finance, the Honourable Paul Martin, on behalf of the government of Canada, stated that:

> *...providing tax relief as recommended by the Commission would raise serious equity and administrative issues. Allowing owners of water-damaged dwellings in BC to deduct the costs of repair and avoid sales taxes would be unfair to other homeowners whose homes may also be in need of repair and who would be denied this treatment.*
>
> *In addition, it would be very difficult to justify special tax treatment for unexpected repair costs in some circumstances (such as water damage), and not in others. As you no doubt know, similar proposals for tax relief were put forward in the wake of the Saguenay and Manitoba floods, as well as the Quebec/Ontario ice storm. As you stated, in those circumstances, many homeowners experienced similar costs to those of owners of water-damaged BC homes. In all of these cases, the federal government cooperated with the provinces in providing direct financial assistance to victims. However, it was recognized that the tax system, which is designed to apply to all taxpayers in equal measure, is not the proper tool to provide relief in these unique situations.*
>
> *- Letter to William Wahl from Honourable Paul Martin*
> *August 26, 1999*

Accordingly, the Commission's recommendations on GST exemptions (plus refunds for repair renovations already paid) and equal treatment for homeowners who rent and those who reside in their own homes, have been turned down by the federal government.

The Commission notes the position of the federal government, that the federal tax system not be used to provide financial support for leaky condo owners. However, as the Minister of Finance

states in the above letter, in reference to federal support for the Quebec/Ontario ice storm, *many homeowners experienced similar costs to those of owners of water-damaged BC homes. In all of these cases, the federal government cooperated with the provinces in providing direct financial assistance to victims.*

In fact, the following table provides the most recent estimates of the direct federal financial contribution for assistance because of the ice storm.

Federal Funding Assistance for the Ice Storm

Table 10

Department	Estimated Contributions ($ millions)
Emergency Preparedness Canada	582.4
Canadian Armed Forces	44
Canada Economic Development	7
Industry Canada	2.9
Agriculture and Agri-Food Canada	13.6
Human Resources Development Canada	67.2
Natural Resources Canada	(to be determined)
Total	**$717.1**

Source: Emergency Preparedness Canada.

The Commission recognizes Minister Martin's desire to treat all Canadians fairly and accepts his reasoning. Such reasoning is completely compatible with the recommendations in Part II, Volume I, and recommendations in this report.

II. Provincial Government

The importance of residential construction to BC's economic growth was emphasized in the first Commission's report and Part II, Volume I. By way of review, residential construction is the second largest industrial activity in the province, with approximately 10 percent of the province's annual output and 10 percent of the province's employment driven by this sector.

The major economic downturn in Asia; a significantly lower level of immigration; declining resource commodity prices; and out-migration from BC to other provinces, has caused a major decline in the BC housing sector. The Commission believes a significant contributor to this decline, particularly in the multi-family residential sector, is the leaky condo disaster.

Government structure should reflect the importance of residential construction to the economic health and well being of the province. Housing, as an area of public policy, has been neglected.

All housing issues, including those related to leaky condos, would benefit from a clearer, more direct focus. The responsibility for housing issues has resided in a number of ministries, for at least the past decade. This has contributed to some confusion in the industry.

> ***Part II - Volume II Recommendation #5: The provincial government create a Housing Ministry responsible for BC Housing, housing policy, residential construction, the Homeowner Protection Office, building standards, and the BC Building Code.***

At no time than the present has it been more critical to establish a positive environment for residential construction.

> ***Part II - Volume II Recommendation #6: A Legislative Select Standing Committee be established to review, annually, for the next five years, all housing issues.***

> ***Recommendation #3: That the role and responsibility of what was formerly the Building Standards Branch, be reinstated under the proposed Homeowner Protection Office, as part of the Education and Research function of this new body, and that it provide guidance and direction on both the interpretation and enforcement of the building code.***

Unfortunately, recommendation #3 has not been implemented, although the PAC has the authority to provide advice to the provincial government on the BC Building Code, federal authorities on the National Building Code, and the City of Vancouver on its Building Bylaw.

Without exception, every presenter who made mention of the Building Standards Branch during the first set of hearings, as well as the most recent one, called for its reinstatement. The interpretation of the Building Code, and the Building Code review and adoption process, rested with this body in the past; but never before has the need for this role and function been as great. A reduced staff complement, since the Branch was downsized in 1997, currently resides in the Ministry of Social Development and Economic Security. This staff attempts to meet the needs of the building industry. However, without the proper resources, the tasks arising out of the current crisis will prove too large; the industry need for support, too diverse. The status quo cannot be successful.

The Commission envisioned the HPO would carry out the Building Standards Branch function, supporting not only the Code interpretation and development needs of the residential construction industry, but also play an important role in the research and education mandate of the PAC. There is no reason why the Branch could not perform the standards function for all construction within the HPO.

The Commission strongly urges the implementation of recommendation #3, including that the Building Standard Branch role and function be housed in the HPO.

A. Homeowner Protection Office

One of the main responsibilities of the first Barrett Commission was to strengthen consumer protection and to ensure that the deterioration in housing construction standards never happened again. The establishment of the *Homeowner Protection Act*, which included the creation of the Homeowner Protection Office, arose from these aims. The primary purposes of the HPO include:

i) mandatory, private sector, third-party, home warranty;
ii) residential builder registration and licensing;
iii) assistance to homeowners of leaky homes as a lender of last resort through the Reconstruction Loan Program; and
iv) research and education to assist consumers and the industry.

The provincial government responded to the recommendations quickly and the HPO was approved by the Legislature in July 1998. The HPO commenced operations on October 1, 1998. The HPO under the authority of the *Homeowner Protection Act*, is a crown corporation, governed by a Board of Directors, appointed by the Minister of Social Development and Economic Security. The office also receives advice from the Provincial Advisory Committee (PAC) on homeowner protection, on emerging issues in residential construction, and on the BC Building Code. The PAC includes representation from a broad range of interests including consumer, industry, professionals, and local government.

From the submissions and presentations made to the second inquiry, it is clear that there has been unanimous endorsement of the HPO and the benefits the residential construction industry has received as a result of its creation. The Commission would like to congratulate the efforts of the staff of the HPO in organizing its activities in a timely and effective manner to ensure a proper mandatory warranty and licensing system is in place; financial assistance to those most in need; and education and information being produced and widely circulated.

1. Homeowner Reconstruction Loan Program

Among recommendations in the first Commission report was the establishment of the Reconstruction Loan Fund. The Commission in Part II, Volume I, has since addressed the major lack of financial support and the attendant economic crisis arising from the lack of response by the federal government. The Commission recommended a Grant Program which would not only assist homeowners hit by this disaster, avoid financial pressures being borne by the general population far in excess of what is necessary, but also provide a form of request that the federal government has suggested it could respond to.

Eligibility requirements for the Reconstruction Loan Program require that homeowners:

1. own a leaky condominium or home where the building envelope deteriorated

sooner than expected due to defective design or construction;

2. do not have savings or investments that could be used to pay for repairs (pension assets; RRSP assets, and the first $10,000 in liquid assets are exempt); and
3. do not have enough equity in their home to qualify for a conventional loan or they cannot afford the monthly payment on a conventional loan.

Loan amounts are based on the cost to repair the building envelope plus related legal costs. Participating lending institutions provide the principal for the loans. Homeowners make monthly, principal-only payments to the lending institutions at an affordable level set by the HPO. The HPO pays the interest portion of the loan directly to the lending institutions on behalf of the homeowners.

Co-operative housing projects are also eligible to apply for financial assistance under the Reconstruction Loan Program. Due to the ownership structure of co-operatives (no separate legal title to the individual units), the no-interest loans are provided directly to the co-operative.

Homeowner's Reconstruction Loan Program Summary
January 31, 2000

Table 11

	Number	Amount	Average
No-interest loans through first mortgage lender	1,551	$29,372,075	$18,938
No-interest loans through HPO	105	$1,837,845	$17,503
Deferred Payment Loans through HPO	241	$4,908,550	$20,367
Co-operative Housing Loan Program	573	$21,799,900	$38,045
Total	2,470	$57,918,360	$23,449

Source: HPO

HPO reports that, in most cases, no more than ten percent of the homeowners in a building qualify for a no-interest repair loan. However, in some buildings the number of homeowners who qualify could be as high as fifty percent.

HPO had received 2,562 loan applications and had approved about 1,900 no-interest loans in 248 buildings, totaling $36.1 million as of January 31, 2000. About 311 applications failed to meet the eligibility criteria, or were withdrawn, with 354 applications currently being processed. The average loan amount is $19,000.[43]

Lower mainland municipalities of Coquitlam, Surrey, and Vancouver represent the larger sources of loan applications followed by Victoria.

[43] The Renewal of Trust in Residential Construction, Part II, Volume I also deals with these issues (Chapter TWO, pages 18 - 20).

Loan Applications by Geographic Location
As At January 31, 2000

Table 12

Location	Number	Percent
Coquitlam	430	16.8
Surrey	395	15.4
Vancouver	357	13.9
Victoria	220	8.6
Abbotsford	208	8.1
Port Coquitlam	168	6.6
Richmond	134	5.2
New Westminster	129	5.0
Delta	81	3.2
Langley	74	2.9
Nanaimo	66	2.6
North Vancouver	62	2.4
Pitt Meadows	52	2.0
Burnaby	37	1.4
Nelson	29	1.1
White Rock	20	1.1
Maple Ridge	24	0.9
Total	**2,562**	**100**

Source: HPO, Errors due to rounding, Excludes the loans to Co-operative Housing.

The following table shows the approved loans by year of building construction. It is interesting to observe that a significant number of buildings with premature building envelope failures were built prior to 1989, giving rise to questions regarding the industry's allegations that the 1985 BC Building Code is to blame (the 1985 Code, adopted in late 1987 would not have applied to buildings prior to 1989). In fact, as a proportion of the total multi-unit buildings constructed from 1983 to 1998, pre-1989 building failures represent a greater proportion of the total residential stock than post-1989 failures.

Mr. Shayne Ramsay, CEO of the HPO, confirmed in testimony before the commission that the collapse of NHW will further intensify the tremendous pressure on the Reconstruction Program by pulling another group of people into the problem of financing repair costs--people who assumed a significant portion would be handled by NHW.

Approved Loans and Buildings by Year of Construction
1984-1997

Table 13

Year	Approved Loans (%)	Buildings (%)
1997	1.4	0.6
1996	5.9	3.1
1995	11.8	3.1
1994	21.7	14.6
1993	16.4	15.9
1992	8.9	9.2
1991	7.5	9.2
1990	7.2	9.2
1989	5.0	11.6
1988	2.2	7.9
1987	0.2	0.6
1986	1.8	3.1
1985	5.3	2.4
1984	0.3	1.8
Prior 1984	3.8	5.5
Unknown	0.6	2.4

Source: HPO

An important aspect of the Reconstruction Fund is how both CMHC and the financial institutions "benefit" from the loan assistance program. Ironically, the provincial program has bailed out the banks, credit unions, and CMHC. Mr. Shayne Ramsay, CEO of HPO confirmed at the hearings on September 17, 1999, that the loan fund represented the "last resort" for the applicants, and that nearly all would have foreclosed on their existing home mortgage if the fund was not available. Approximately 63 percent of these mortgages are CMHC insured; 37 percent are not.

> ***Mr. Ramsay:*** *The general criteria is if a homeowner's able to qualify through conventional means, and by "conventional means", typically that's adding or increasing their first mortgage. They would have to meet the bank's TDS and GDS ratios. If the homeowner doesn't--is not able to obtain that kind of financing, they they're eligible for assistance under our program.*
> ***Ms. Allan:*** *Would it be fair to say that many of the people that come to you may have gone into foreclosure or bankruptcy if you weren't there?*
> ***Mr. Ramsay:*** *I think that's a fair statement.*
> ***Ms. Allan:*** *So if we're looking at the benefits of the Reconstruction Fund, not only do the homeowners benefit if they're able to qualify, but the banks and CMHC, who would be facing a defaulted loan, are also major beneficiaries of the fund?*
> ***Mr. Ramsay:*** *Yes, absolutely.*

Ms. Allan: *And so it would be fair to suggest---and I think you said the number of applicants that you have approved is---I forgot the number?*
Mr. Ramsay: *Slightly more than 1,000*[44]
Ms. Allan: *That some part of that number would have been in the foreclosure database.*
Mr. Ramsay: *I think you could assume a very high number, if not all, would have been in a foreclosure situation.*
Ms. Allan: *And since part of the Commission's work is to look at the impact on the economy and individuals as a result of the lack of quality construction and New Home Warranty's failure, is foreclosures and the impact on the economy, when we are looking at foreclosure information, it would then be fair to take some portion of that number and use that as what could have happened in the economy without some form of financial support for homeowners?*
Mr. Ramsay: *Yes*
Ms. Allan: *Okay. What percentage would you think would be a reasonable number of those thousand people?*
Mr. Ramsay: *...it would be a very high number. Probably safe to say almost all.*

The number of foreclosures would have been almost 2,500 more during the past year than what is already occurring. Notwithstanding the Reconstruction Loan Fund, many families and individuals are still unable to finance their special levy for repairs and are being forced into foreclosure or bankruptcy. The Commission has been informed that following a court judgment in a foreclosure being registered, the individual's credit rating is immediately assigned an eight (on a scale of one to nine) on their credit report. They may have had a perfect credit rating in the past--most of them have--but the foreclosure triggers an automatic eight with the Vancouver Credit Bureau.

When you have a poor credit rating...you may not be bondable, and...employment may be jeopardized.

- Bruce Chisholm, Trustee
October 14, 1999

Part II - Volume II Recommendation #7: The Superintendent of Bankruptcies Office classify leaky condominium foreclosures with a maximum rating of six or under which avoids employment jeopardy as a result of a foreclosure.

2. PST Relief

On June 28, 1998, the provincial government announced a provincial sales tax relief grant for repair costs to leaky homes. The grant, administered by the HPO, is based on a formula and applies to eligible repairs completed on or after July 28, 1998. While this grant follows

[44] As of January 31, 2000 the number is 2,470.

recommendations of the first Barrett Commission report, it does not apply to all repairs retroactively, which was part of the recommendation. Based on the Commission's estimate of the cost of repairs, the PST grant, if implemented retroactively would represent about $25 million over the next 5 - 7 years. As of January 31, 2000, the HPO has approved 27 applications, rejected 1, and has 5 in process, for a total of 33 applications received. The following table illustrates the financial implications of the program thus far.

Approved PST Grants
As of January 31, 2000

Table 14

	Total Approved Grants	Average per Strata Corporation	Average per Homeowner
Amount of Repairs	$14,447,000	$535,075	$15,930
Amount of Grant	$404,515	$14,980	$446

Source: HPO

3. Residential Builder Licensing and Mandatory Third-Party Warranty System

Recommendation #38: Under the authority of the Homeowner Protection Act, immediate, mandatory warranty for all residential housing built, as well as units under going renovations for structural or building envelope purposes. All units to be enrolled prior to the start of construction or renovations to receive the benefit of inspections.

As of July 1, 1999 building permit applications for new housing have been subject to licensing and warranty. The Commission understands that the private sector warranty companies have inspection requirements during construction. Licensing and warranty for repairs has not yet been introduced. The Commission strongly urges that this be a priority as many homeowners need the security provided by warranty on repairs.

The primary builder licensing requirement is registration with an insurance company. The builder then signs an agreement with the HPO undertaking to meet certain terms and conditions including compliance with regulations and standards that are applicable to the construction of the new home. If the builder breaches this or any other conditions of the agreement, the Registrar can suspend, revoke, or impose conditions on the builder license. Further, the HPO has informed the Commission that, over the next 12-18 months, additional requirements will be put in place for a builder to maintain their license. This will include mandatory education and training requirements.

One of the disclosure requirements in the license application and renewal process is whether or not the builder applicant has been refused home warranty insurance coverage by an insurance company. If the answer is yes, the Registrar will conduct additional investigations before the license is issued (or refuse to issue the license). Further, Section 9(4)(a) of the HPA allows the

Registrar to require reporting from the insurance company as to the risk profile of builders. This information will include builders who have been de-registered by the insurance company and the reasons for the de-registration. This will form part of the builder licensing consideration by the Registrar.

Due to the collapse of NHW, the licensing and regulation of warranty companies was delayed from April 30, 1999 to July 1, 1999. This delay caused significant confusion among consumers, and saw many builders taking out permits to avoid the registration and mandatory warranty deadline. Accordingly, the Commission issued an Interim Report on November 8, 1999.

In a number of presentations to the Commission, homeowners complained about the lack of consumer warranty protection and the lack of disclosure on currently-marketed homes. Ms. Nona Saunders, president of the Condominium Homeowners Association (CHOA), which has over 800 strata corporations, representing 27,000 units, told the Commission:

> *"there is a virtual dog's breakfast of warranty out there, and many unsuspecting buyers are not sure of what they're getting. The opportunity for developers to purchase stronger warranty, including that that would meet the new provisions of the legislation, is available but has not been widely embraced. We feel that this does create a risk for home buyers because they don't know what they're getting. And there should be some means in disclosure of exactly what is the warranty on the home you're buying today, what does it cover, who it's backed by, and what are the exclusions."*

Shayne Ramsay, Executive director of the Homeowner Protection Office, in his testimony to the Commission, has confirmed this myriad of coverages from non-existent to builder's own:

> *"where some of the newly-constructed homes on the market will have the 2-5-10 year mandatory warranty as required by the Act, while other new homes on the market constructed with building permits applied for before July 1st, which have a variety of different warranties or even no warranty at all."*

This problem has been compounded because Canada Mortgage and Housing Corporation (CMHC), in its provision of high-ratio mortgage insurance, did not make mandatory the replacement of its warranty coverage on new and unsold construction when New Home Warranty became insolvent and filed for bankruptcy protection.

Clearly, we have a problem. The magnitude could affect as many as 20,000 homes between 1999 and 2001. It is not only the permits taken out prior to July 1,1999 that are affected by the transition period, but also permits applied for prior to July 1, 1999 which may be pulled subsequent to that date. Permit renewals may also avoid mandatory warranty protection well beyond 1999.

The Commission made the following recommendations:

***Interim Bulletin Recommendation #1**: All advertising related to the marketing of new residential construction, with one or more units remaining for sale on or after November 15, 1999 must clearly identify the nature and scope of warranty coverage and whether or not this meets minimum industry standards as required by the Homeowner Protection Act and must place signage in front of the project that clearly indicates whether or not the project meets new Homeowner Protection Act standards.*

***Interim Bulletin Recommendation #2**: That the Homeowner Protection Act Regulations be amended to require that all residential construction permits, issued prior to July 1, 1999, be subject to the same regulatory and warranty requirement as permits issued subsequent to July 1,1999, if such permits are renewed on or after November 15, 1999.*

***Interim Bulletin Recommendation #3**: Require that the disclosure statements and prospectuses filed with the Financial Institutions Commission contain similar information to that described in Recommendation #1 above, and that existing prospectuses and disclosure statements, for buildings that have one or more units remaining for sale, file an amended prospectus and disclosure statement with the Superintendent of Real Estate.*

***Interim Bulletin Recommendation #4**: That builders/developers recognize the importance consumers place on adequate warranty protection as part of the conditions of sale and make all and best efforts to honour consumers' requests for return of deposit monies should promised warranty coverage prior to NHW's failure, not be replaced by the developer.*

The Commission is pleased with the statement released by the Superintendent of Real Estate that, effective December 17, 1999, all Disclosure Statements must advise purchasers whether the warranties being offered are required under the *Homeowner Protection Act.*

As of February 15, 2000, HPO reported nearly 1400 residential builders were licensed as per legislation. All registered builders must qualify with a FICOM-approved warranty provider as a pre-condition of registration. The minimum, mandatory warranty coverage on all residential construction in BC must include 2 years on labour and materials, 5 years on the building envelope, including water penetration, and 10 years on structure. There are five approved warranty providers in BC.

The Commission had anticipated that owner/builders would be required to register their status with Land Titles, thus avoiding enforcement problems because builders could not sell the property without adequate warranty coverage. The provincial government did not implement this requirement and, as a result, HPO has had significant difficulty policing the owner/builder category. Builders are circumventing registration by pretending to be owner/builders. The Commission understands the HPO is working on alternative approaches to the owner/builder

registration problem. ***The Commission urges the provincial government to re-examine its approach as both an effective and efficient solution is needed to the tendency of some builders to circumvent consumer protection, at the expense of others within the industry.***

It is important to note that at this stage, HPO accepts builders with the criterion that the builder has been accepted by a warranty company. There is no independent examination of past building practices or customer service. The Commission encourages the HPO to adjust its registration and licensing criteria to incorporate standards of quality.

4. Mandatory Warranty and Licensing for Building Envelope Repairs

The HPO needs to put in place licensing and warranty requirements for building envelope repair contractors. Following the distribution of a discussion paper in August 1999, the HPO is now proposing regulations related to this area, which include:

i) 5-year water penetration warranty on the building envelope and 2-year warranty on labour and materials;
ii) warranty acceptance of repair contractor prior to HPO licensing;
iii) building envelope consultant to be registered with HPO and must carry third-party liability insurance;
iv) building envelope repair defined as 60 percent or more of all the cladding replaced; and
v) warranty coverage cannot be less than 125 percent of the repair cost.

The Commission is concerned that the HPO definition of building envelope excludes roofs and garage parkades. Roofs were included in the original definition of building envelope advanced by the Commission. To exclude roofs suggests that water falling on the side of a building needs more protection than water falling on top of a building. Eliminating re-roofing from the definition will mean roof repairs will be performed to a standard that is lower than repairs to wall systems. The Commission is also concerned that the required warranty does not include a structural component.

> ***Part II - Volume II Recommendation #8: That the mandatory repair warranty program include roofs in the definition of building envelope and that the repair program include 10-year warranty for structural repairs.***

5. Research and Education

As noted earlier, the HPO has the important function of, and responsibility for, research and education. This is to provide resources and information regarding building science issues; cost-effective building techniques; best practices for retrofitting housing; Building Code changes; and current homeowner issues. The HPO has received over 17,000 calls on its toll-free number in the

past year, and 14,000 hits on its website.

Recommendation #5: That the mandate of the Education and Research function of the Homeowner Protection Office include the dissemination of information to the building industry.

Section 12 of the *Homeowner Protection Act* provides for this recommendation.

Based upon an AIBC contribution of $250 per architect, building licensing fees, and other contributions, the Provincial Advisory Committee (made up of a broad range of industry and government representatives) determines research and education priorities. The following is a brief summary of research initiatives undertaken, either directly, or with others.

Buying a New Home Guide
This brochure was updated in January 1999 to provide information and guidance to consumers wishing to purchase a new home. Designed to fill a gap in the literature for homebuyers, this brochure provides information on home warranties, residential builder licensing, hiring inspectors, and the role of lawyers and lenders in the transaction.

Managing Major Repairs
The HPO, in cooperation with the Ministry of municipal Affairs and CMHC, produced this 100-page guide which provides condominium owners with step-by-step detailed information on the process of repairing a leaking building. Topics include, assessing the problem and developing a solution, implementing repairs, financing options, and legal considerations.

Land Use Planning and Weather Protected Buildings
This document serves as a best-choices guide to encourage local government in reviewing their land-use bylaws and other policy or design related documents to encourage development of improved wall assemblies. This work is a product of recommendations from the first Commission regarding calculation of density (FSR) and includes a discussion of other factors, such as site coverage, height and setbacks, as well as design features (balconies, covered walkways, wall details, and overhangs).

High-Rise Envelope Details Study
It is generally agreed that performance problems experienced by high-rises are detail-related and envelope-system related. It is anticipated that this study will review details and systems that have performed well as compared to systems that have not performed well.

Building Code
On February 8, 2000, HPO held a one-day workshop on Building Code issues. It was attended by over 40 individuals representing 16 industry, government, and

professional organizations. Recommendations from this workshop will be fed into future code development and research initiatives.

Monitoring New and Remediated Wall Assemblies
The purpose of the monitoring program is to revise CMHC's protocol for monitoring buildings and adapt it to wood-fame, multi-unit developments in this climate. The intent is to monitor new wall construction, as well as remediated wall construction, that uses rain-screen technology. The information gathered through effective monitoring could be fed back into the development of the next edition of the Best Practices Guide.

Leak-Proofing Windows
The CMHC Survey of Building Envelope Failures found that a major contributor to moisture problems in buildings was water leakage occurring at the jamb sill connection of windows. The Leak Proofing Windows study will address various concerns, including manufacturing windows, transportation and storage, and installation techniques.

Envelope Drying Rates Analysis
This research project will provide data on the drying rates of walls under controlled laboratory conditions.

Builder's Tool Box
Although the Best Practices Guide is being used by builders and trades, a Builder's Tool Box is being developed which includes documents, bulletins, and visual aids on the best practices.

6. Alternative Dispute Resolution

Recommendation #69: That the Homeowner Protection Act make available an alternate dispute resolution mechanism (ADR) for issues arising from the problems surrounding residential construction---in particular, building envelope failures and that:

i) the system be optional for consumers but compulsory for the developer, builder, contractor, sub-contractor, professional, and warranty provider; and

ii) mediation be subject to private proceedings, while arbitration would be conducted under full disclosure rules.

A mandatory mediation process has been established for owners of homes covered under the new mandatory warranty system. This mandatory process has been established to compel warranty insurance providers to mediate with homeowners. One of the major problems with NHW, which the Commission heard time and time again from strata owners, was the claims determination process was controlled by NHW, often to the benefit of the builder.

New regulations, introduced in May 1999 for residential construction disputes between homeowners and builders, are an attempt to achieve quicker and less expensive resolutions than are currently offered within the court system.

However, the Commission has heard from homeowners that because the builder often does not want to settle, the process is weak. The Commission recommends that mediation become binding. If the Compensation Plan is adopted, this problem should disappear.

B. Financial Institutions Commission (FICOM)

During the 1980s and 1990s, multi-family construction was the fastest growing component of BC's housing industry--an industry experiencing boom conditions until 1995. Since then, both single- and multi-family starts have fallen dramatically. However, the strata form of property ownership is very significant in the overall make-up of the housing stock, and provides the greatest future opportunity for home ownership in urban centres, including Victoria and Greater Vancouver. Solving construction quality problems in multi-family construction is of critical importance to the future quality of life in British Columbia.

FICOM currently has a staff of 80 and is organized into six departments. Of those six, the Insurance and Real Estate Departments are most relevant in rebuilding trust in residential construction. FICOM administers ten statutes, including the *Real Estate Act*, *Financial Institutions Act*, and *Condominium Act* (soon to be the Strata Property Act). These provide regulatory rules for the protection of the consuming public. The regulatory rules are to:

> *First, protect depositors and policy holders against the insolvency of insurance companies, trust companies, and credit unions and, second, to safeguard consumers against improper market conduct in the financial services and real estate industries.*
>
> *- Robert Hobart, CEO, FICOM*
> *November 1, 1999*

1. Strata Sales and Strata Corporation Issues

The Commission received a detailed presentation from Ms. Adrienne Murray, Deputy Superintendent of Real Estate and Mr. Robert Fawcett, Executive Director of the Real Estate Council, on the regulatory environment as it relates to real estate. The Commission also received presentations from numerous strata councils and homeowners who raised issues and concerns over the current regulatory environment. In particular, developer-employed (non-licensed) sales agents, disclosure statements, licensing of strata managers and strata management companies, and the *Condominium Act* (soon to be the Strata Property Act).

i) Developer-Employed (Non-Licensed) Agents

The Real Estate Act establishes the licensing of real estate agents. The majority of these

regulatory responsibilities have been assigned, or delegated, to the Real Estate Council, comprised of 19 members (14 elected agent-members, 3 salesperson members, and 2 public [layperson] members appointed by the provincial government).

Under the Act, individuals who act on behalf of another, for a fee, in the purchase and sale or rental of real estate, must be licensed. An agent's license is issued to a company and the majority of individuals are licensed as sales people or nominees.

> *The purpose of the licensing regime is to ensure that those transacting with agents of the owner in a real estate transaction can be assured that the agent has obtained the necessary education, is bonded, maintains errors and omissions insurance, is properly supervised by a nominee and is subject to the sanctions of the Real Estate Council in the event they misconduct themselves.*
>
> *- Robert Hobart, Superintendent of Real Estate*
> *October 14, 1999*

There are exemptions under the Act regarding the use of licensed agents in a real estate transaction. For example, anyone may sell their own real estate without employing a real estate agent. More importantly, in the area of residential construction, there is currently no requirement for licensing employees of a development company who sells or leases the property on behalf of that company. Therefore, a significant number of new home sales fall outside the Real Estate Council's authority.

The Commission has received representations requesting the that developers' marketing personnel, for the sale of multi-family homes, be licensed under the *Real Estate Act* as a method to further protect the public by ensuring adequate standards of education, regulation, and licensing.

> *In order to get licensed in British Columbia as a real estate sales person, you must complete the real estate salesperson's prelicensing course. That course is 26 chapters long with specific learning objectives...on the Real Estate Act, the Residential Tenancy Act, the Condominium Act, the law of agency, the law of contract, types of ownership and tenancies, basic design and construction, and condominiums. Once an individual has a salesperson's license, they must complete the applied real estate course. It's a condition of licensing [and]...covers information on marketing, contracts, financing, the offer and completion process, the Real Estate Act and Code of Ethics.*
>
> *- Robert Fawcett, Executive Officer, Real Estate Council*
> *January 13, 2000*

In addition to education standards, there are licensing and performance standards that real estate agents must meet. The British Columbia Real Estate Association (BCREA) is an association of real estate boards and associations and provides the multiple listing service (MLS), standard forms of contract, and has been delegated the continuing education responsibility by the Real Estate Council.

BCREA continues to be concerned by the public misperception of unlicensed developer employees being "seen" by the public as licensed Realtors. BCREA does not have the same concern with the public perception of owners selling their own properties. Their signs and ads usually indicate "For Sale By Owner," which clearly alert the buying public that they are not dealing with a licensed professional who is subject to the provisions of the BC Real Estate Act. When wrongfully treated, the public has recourse to civil litigation. If dealing with a Realtor, they have additional recourse to the Real Estate Council under the BC Real Estate Act and to the Realtor's Real Estate Board for disciplinary procedures. The public is further protected by the Realtor's errors and omissions insurance. The public does not have these additional safeguards when dealing with unlicensed employees of a developer and often are unaware of this lack of protection.

- Dave Watt, BCREA
January 12, 2000

The Commission agrees with this recommendation from BCREA.

Part II - Volume II Recommendation #9: That the provincial government amend the Real Estate Act to require the conditional licensing of multi-family developer sales personnel.

ii) Disclosure Statements

Many presenters pointed to the fact that certain real estate disclosure documents did not protect them from being sold a "leaky condo." Accordingly, the Commission investigated the matter of public disclosure and the variety of disclosure statements used in relation to residential real estate transactions.

From the Superintendent's perspective, the key disclosure document is the requirement under Part II of the Real Estate Act, requiring developers to provide purchasers with a Disclosure Statement prior to the sale of sub-divided land, including strata lots.

Prior to the mid 1980s, all developers of sub-divided land were required to file a prospectus. This was changed to permit the filing of a Disclosure Statement (except in the case of a sale of time-shares located outside the province). This disclosure statement is intended to provide purchasers with material information relevant to the development. In the case of strata developments:

...because ownership or the use of property is shared, matters such as common property, by-laws, budgets, and information about overall development is information that purchasers of such developments should know. When considering the use of Disclosure Statements, it is important to consider when Disclosure Statements are used. Currently, for most residential developments in order to obtain sufficient financing, developers must have obtained a prescribed

number of pre-sales. A developer is permitted to market a development for six months prior to obtaining a building permit or financing. In the majority of cases most residential developments are marketed prior to the developer obtaining financing. Thus, for many purchasers, they are purchasing prior to the building permit being issued and prior to the receipt by the developer of confirmed financing.

- Robert Hobart, Superintendent of Real Estate
October 14, 1999

Consequently, the Disclosure Statement mandated by the *Real Estate Act* has not been of assistance in addressing the leaky condominium issue, since the document is prepared prior to the construction of the development and does not contain information relating to construction defects or building envelopes. Following consumer complaints, a summary statement is now required which contains information, easier for consumers to understand. The Superintendent's Office is currently in the process of creating a brochure required by developers to distribute with Disclosure and Summary Statements.

There is a disclosure document developed and distributed by BCREA, which is not mandatory under the Real Estate Act. Property Disclosure Statements (PDS) have been in place since 1992, but the form of PDS intended for use in the sale of strata properties is relatively new, having been introduced in November 1997. These forms were recently amended to include matters on third-party warranties and owner/builder declarations (but not entirely to the satisfaction of the Homeowner Protection Office).

Part II - Volume II Recommendation #10: that PDS be amended according to the HPO requirements, and that they become mandatory under the Real Estate Act. They should also include the requirement that a property cannot be sold unless both parties to the sale complete and sign the document.

iii) Licensing of Strata Managers and Strata Management Companies

The Commission's first report called for the registration and licensing of property managers by the HPO.

Recommendation #52: All property management firms for condominium buildings be registered immediately with the Homeowner Protection Office.

Recommendation #53: All property management firms for condominium buildings be licensed by the Homeowner Protection Office, pending discussion with the industry on the most appropriate form of education, training, and qualification.

In principle, recommendations #52 and #53 have been adopted, except the provincial government intends to license and regulate property management firms under the authority of FICOM and its

agency, the Real Estate Council. Apparently, the rationale behind this approach is that property managers, by virtue of their leasing activities as well as their collection of rents, are currently registered with the Real Estate Council. Many property managers also act as strata managers for condominium buildings. Therefore, it is suggested that licensing these managers under the HPO could be viewed as dual licensing.

The Commission has serious concerns regarding the regulation, training, and qualifications for property management firms being under the authority of the Real Estate Council and stresses the need for this regulatory role to be performed by the HPO and implemented expeditiously, given the importance of strata property management to homeowners. The Commission also has concerns about the perceived and real conflict of interest on the Real Estate Council, vis-à-vis their relationship to property management companies, which may be owned by a realty firm. It is necessary to avoid any situations where strata groups and consumer organizations feel there is a bias by a regulatory council.

Although the principle of the Commission's recommendations has been adopted, Regulations will not be forthcoming until at least mid-2000, at the earliest--two years after the Commission's first report. This recommendation should be implemented as quickly as possible.

> ***Recommendation #54: All strata councils be trained in the responsibilities of property management, if they choose not to employ the services of a management company. A log book be maintained to ensure the maintenance responsibilities are fulfilled on a continuous basis.***

It is important to note that recommendations #54 - #66 of the Commission's first report pertain to the new *Strata Property Act*, which has been proclaimed and will come into force on July 1, 2000. Some presenters during the most recent set of hearings expressed frustration and concern that the new Act and Regulations were taking so long to be implemented. Since the Act and the Regulations have not been implemented, the Commission urges the Policy and Legislation Branch, Attorney General's Department (which determines the content of the Acts that FICOM administers), adopt outstanding recommendations, as discussed in this report.

Recommendation #54 has not been adopted in the new *Strata Property Act*. The Commission, in its first set of hearings, heard testimony after testimony of the problems faced by volunteer strata members, untrained in the responsibilities they had assumed. Overlooking the need for strata member briefing and a minimum amount of training regarding the responsibilities of a strata member, is negligence.

> ***Recommendation #54 (revised): The HPO prepare a training manual outlining the nature and scope of strata members' role and responsibilities in the event the strata elects not to hire a property management company. This manual to be provided to all purchasers of strata properties as the time of sale.***

iv) The Condominium Act (Strata Property Act)

In its first report, the Commission made numerous recommendations to amend the Condominium Act. These recommendations provide the legislative framework for the creation of a strata lot and the structure and mechanisms for the ongoing operation of the strata corporation. The vast majority of these recommendations have been accepted and incorporated in a new *Strata Property Act*, approved by the Legislative Assembly in 1998, with amendments in 1999.

The Superintendent of Real Estate is responsible only for a limited approval process, including schedules on strata plans and by-law amendments made by a developer.

> *The various sections of the Act set out the mechanisms by which a strata corporation should operate and the mechanisms available to resolve disputes. Under the Act, it is up to the owners themselves, with the possible assistance of the courts or an arbitrator, to ensure compliance with the Act.*
>
> *Because issues that arise are personal matters among condominium owners, the Act does not include provision for the government to interfere in the problems that may occur. The Act is self-regulation and therefore does not contain mechanisms which permit the Superintendent or any other government office to become involved in the day-to-day operation of a strata corporation.*
>
> *- Robert Hobart, FICOM*
> *October 14, 1999*

The Act as it currently stands is not enforced by the Superintendent's Office, and any contractual disputes between purchasers and developers is left to arbitration or to the courts. Experience has shown with the leaky condo situation that these avenues are not satisfactory because of the lack of willingness among developers to resolve disputes and the uneven distribution of time and monetary resources between parties.

> *The Condominium Act and the proposed Strata Property Act are both self-regulating statues. For the most part there is no authority to make a ruling on any problem, other than placing the problem before arbitrators or judges. Repeatedly, I wondered why the government had a Residential Tenancy Office for landlord and tenant problems and disputes, but no Strata Corporation office.*
>
> *Tenants have nothing more than a damage deposit invested and unless they rent under a longer lease, they can give one month's notice and move, if and when they choose. They are not stuck. Condominium homeowners have their money invested in the strata lot and the only way out for them is if they can sell. Frequently, they've invested everything they have, or are mortgaged to their limit; then problems arise and they are stuck to live with them, or hang on even if it means going into foreclosure. Residential condominiums are owned by people from all walks of life...for many condominiums are the beginning homes, and the homes of the elderly--not the people with the strongest voice in our society.*

It could be beneficial if there was a Condominium Office with knowledge and authority to administer the Condominium Act, Regulations, and other related statutes, and oversee qualified arbitrators and mediators whose services would be made available to strata corporations and owners in a timely manner and at reasonable cost to the parties. Owners who chose could still have lawyers present their cases at their own expense. Fees for services should be sufficient to pay all costs and show something of a profit. It should not be a drain on our taxpayers.

- Enid C. Kirby
November 8, 1999

Part II - Volume II Recommendation #11: That the HPO establish a Condominium Homeowners Office to administer the Strata Property Act and provide services to condominium homeowners in an effort to redress the imbalance created in the market place between developers and consumers.

Recommendation #55: That amendments be made to the Condominium Act to ensure a complete set of records be transferred to the management company or strata council at its first meeting, to facilitate the effective maintenance of condominium structures. These records should include:

- ***i) any plans required to obtain a building permit;***
- ***ii) all documents indicating actual location of pipes, wires, and other infrastructure;***
- ***iii) the names and addresses of all major contractors and sub-contractors;***
- ***iv) all warranties, service manuals, and manufacturers' documentation relating to the common property and common assets; and***
- ***v) maintenance manual, renewal plans, and procedures specific to each multi-family building.***

The new *Strata Property Act*, which is not yet in force, requires that the documents referred to in items i) to iv) be turned over by the owner/developer to the strata corporation at the first AGM. A developer who fails to provide the documents must reimburse the strata corporation for its expenses in obtaining the documents on its own. The Condominium Homeowners Office would enforce these requirements.

Recommendation #56: That additional disclosure be provided to purchasers to assist in assessing the health of a strata complex including:

- ***i) any amount that the owner is obligated to pay in the future for a special levy;***
- ***ii) any approved expenditures still to be withdrawn from the contingency reserve fund;***
- ***iii) any outstanding notices or work orders against the strata***

corporation; and

iv) a building history and construction problems, if any.

The *Strata Property Act* requires that the information referred to in items i) to iii) be provided to prospective purchasers by means of an "Information Certificate." The Commission has been advised that disclosure of a building history and construction problems is not required because of the subjective nature of this type of information. The Commission does not concur with this reasoning, as engineer reports and strata minutes can chronicle problems and their redress.

Recommendation #57: That the Condominium Act be amended to clarify the strata corporation's responsibilities to make and keep records, and to make these documents available to owners in a timely fashion. Recordkeeping and access provisions should be moved from the by-laws to the body of the Act in order to reflect their importance. As well, all owners should be allowed to attend, as observers, all strata council meetings.

The new *Strata Property Act* incorporates this Recommendation. Record keeping and access provisions have been clarified and moved from the bylaws to the body of the Act. The new provision allowing owners to attend strata council meetings was placed in the bylaws in recognition that some flexibility may be desirable. For example, stratas should not be forced to rent premises for meetings. The Commission concurs with this reasoning.

Recommendation #58: That all property management companies, hired by developers, have an arm's-length relationship with the development company, and operate as an agent for the strata council.

To protect the interests of minority purchasers, the *Strata Property Act* provides that all non-arm's length contracts entered into by the owner/developer, after the conveyance of the first lot to a purchaser, must be approved by a unanimous vote. The *Strata Property Act* also provides for the automatic termination of strata management contracts entered into by the developer. The Commission concurs with this approach.

Recommendation #59: That the owner/developer act in the best interests of the strata corporation, including pursuing all warranty claims, and informing the strata corporation of its right to take legal action, if this duty is not met.

The *Strata Property Act* sets out a new statutory standard of care for owner/developers, which requires that they act in the best interests of the strata corporation. Although the duty to pursue any available warranty claims is undoubtedly implied by this statutory obligation, this has been clarified by inclusion of a specific duty to pursue warranty claims. The Commission concurs with this approach.

Recommendation #60: That any contracts entered into by the owner/ developer should terminate automatically at the time of the second annual general

meeting.

The *Strata Property Act* provides for the automatic termination of all strata management contracts at the second AGM. The purpose of this proposal is to prevent the owner/ developer from binding the strata corporation into a long-term contract that it did not negotiate. It may also assist in addressing concerns that a strata manager, chosen by the developer, may be reluctant to pursue all strata corporation remedies against the developer. The Commission concurs with this approach.

Recommendation #61: That the approach for establishing sufficient contingency reserves be reviewed with respect to the most appropriate method of ensuring adequate reserves.

The proposed Regulations to the *Strata Property Act* will increase the minimum annual contributions to the Contingency Reserve Fund (CRF) from 5 percent to 10 percent of the operating expenses for the current year. This change is intended to make it possible for strata corporations to more readily accumulate, or replenish, the funds required for repairs. To encourage strata corporations to budget for "ordinary" major repairs, the *Strata Property Act* gives strata corporations the express option of basing their CRF contributions on a depreciation report.

Recommendation #62: That owner/developers contribute a contingency reserve fund for the new strata corporation, with a minimum contribution of 5 percent of the estimated operating expenses, as set out in the interim budget.

The *Strata Property Act* requires owner/developers to establish a CRF for the strata corporation with a minimum contribution of 5 percent of the estimated operating expenses set out in the interim budget. This is to assist newly-established strata corporations in paying for future major repairs. The Commission concurs with this approach.

Recommendation #63: That the Condominium Act authorize and regulate the raising of money for special levies and clarify borrowing options.

The *Strata Property Act* both clarifies rules regarding the borrowing of money by strata corporations, and authorizes and regulates the practice of raising money through special levies. The new special levy provisions will provide a framework for all owners facing extraordinary circumstances (including leaky condos). As well, clarifying the legality of special levies will assist strata corporations in borrowing money by enabling them to use amounts still owing, under special levies, as security for loans.

Recommendation #64: That the Condominium Act be amended to require 75 percent of the votes cast to make a change in the strata councils by-laws, and that votes be limited to one per owner.

The *Strata Property Act* incorporates some of this recommendation by changing the rules on counting votes, so that abstentions are no longer counted as "no" votes. The second part of the recommendation is not included under the new *Strata Property Act*. The Commission finds it regrettable that there has not been a method established to restrict owner/developers from using their votes to defer necessary repairs. Condominium stratas are going to great lengths to get around the 75 percent rule. For example, the Marco Polo waited more than a year, then included their repairs as part of the operating budget. The repairs were approved easily under the rule of a 50 percent vote. The developer, Marco Polo Properties Ltd. took the strata to court and lost the judgment in August 1999. Stratas should not have to go to such lengths. The Policy and Legislation Branch should take steps to develop the intent of this recommendation, while not violating the need for Policy and Legislation to uphold the principle of one lot-one vote. The Commission is of the opinion that, for special levies relating to building envelope repair, the requirement should be reduced to a 50 percent threshold. These special levies could be subject to qualification as, a building envelope repair as determined by HPO. Therefore, recommendation #64 is revised as follows:

> ***Recommendation #64 (revised): That the Strata Property Act or Regulations be amended to allow special levies for building envelope repairs, as approved by the HPO, to require a simple majority.***

> ***Recommendations #65: That the Condominium Act, as it pertains to property lines, be amended so as to facilitate the most appropriate building envelope renovation system.***

This recommendation has not be adopted. The Commission understands that it requires an analysis on the Land Title Act, which has not yet been undertaken. The Commission recommends that this review be undertaken.

> ***Recommendation #66: That legislation be amended to allow developers to use purchaser's deposit funds for cash flow purposes, when such funds are protected by warranty coverage.***

This recommendation was not adopted primarily because the proposal has policy implications for the Real Estate Act. The Commission was concerned because, through mandatory warranty, purchaser's deposits are covered and, therefore, there is a double counting. However, the Commission concurs with the Policy and Legislation's rationale and withdraws this recommendation.

2. Warranty Insurance Providers

Until 1997, home warranties were not regulated as insurance contracts under the Insurance Act or the Financial Institutions Act. Following a review by both the Policy and Legislation Branch of the Ministry of Finance and Corporate Relations, and FICOM, a legal opinion determined that third-party companies offering home warranties could be seen as carrying on the business of

insurance. National Home Warranty and Residential Home Warranty were considered distributors of the warranty program and were each required to obtain a general insurance license.

Because of a previous court decision related to a non-profit corporation, New Home Warranty (NHW) was effectively exempt from the provisions of the Financial Institutions Act. Following the first Barrett Commission report and the establishment of the Homeowner Protection Act, non-profit companies were included under the definition of warranty providers and were to be regulated under the *Financial Institutions Act*.

The Commission was informed that there are currently five insurance companies authorized to carry on home warranty insurance business in BC. These are:

London Guarantee
Pembridge Insurance Company
Commonwealth Insurance Company
Kingsway General Insurance Company
Royal and Sun Alliance Insurance Company of Canada

These companies either market their products directly or through licensed insurance agents. For example, National Home Warranty is the insurance agent for Pembridge Insurance Company, whereas London Guarantee sells its warranty coverage directly.

Recommendation #39: Warranty providers to be regulated by the Homeowner Protection Office.

In general, the Commission is satisfied that useful procedures have been followed in the initial review and regulatory approval of insurance companies wanting to market home warranty insurance in the province. However, to avoid any future insolvencies the Commission recommends:

Part II - Volume II Recommendation #12: That FICOM--in co-operation with HPO--establish regulatory reviews on underwriting practices, claims handling, price determination, and other important criteria such as corporate guarantee requirements, together with the current financial criteria, to ensure the integrity of the warranty market.

The failure of NHW and the gap in the market created by this failure, demands prudent and careful, ongoing analysis and assessment.

The Commission understands why the decision was made to have warranty providers regulated by FICOM instead of HPO, as recommended in the first Barrett report. Warranty is considered to be an insurance product and falls within the jurisdiction of the Insurance Act. However, some accommodation must be made for the information exchange which would have been readily available to HPO, had they been made responsible for regulating warranty providers.

Warranty providers are regulated by FICOM from the perspective of ensuring adequate financial strength and approval of business plans. The Commission is concerned, particularly with the failure of NHW and the gap in the market this failure has created. The concern is that financial solvency may not be sufficient to ensure the integrity of the warranty market. Underwriting practices, claims handling, and other important criteria are not being reviewed and/or approved.

> ***Recommendation #40: Warranty providers be required to obtain a minimum amount of bonding and comprehensive general liability coverage for the developer, general contractor, and sub-trades.***

This recommendation was not adopted. It was decided that warranty providers will decide what form of security they require of builders. The Commission is still concerned that minimum standards be set in underwriting that ensure quality decision making in the industry. What could become poor practices, can drive out good warranty providers.

> ***Recommendation #41: Warranty coverage to be offered in a competitive market by private, third-party warranty providers. Minimum levels of coverage, claims settling procedures, and dispute resolution approaches to be defined by the Act.***

The *Homeowner Protection Act* and Regulations prescribe minimum coverage level, claims handling, and dispute resolution procedures. Until there is some claims history under the new system, it may be difficult to determine whether these minimum standards are sufficient or need to be upgraded.

> ***Recommendation #42: Minimum coverage levels to include 2 years for workmanship and materials, 5 years for building envelope, including water ingress, and 10 years for structural faults.***

This recommendation was adopted and implemented as set out in the *HPA*, Section 22 and in the Regulations.

> ***Recommendation #43: The BC Homebuilder's Association must immediately divest itself of its interest in New Home Warranty.***

This recommendation was not adopted, although the Commission understands that NHW was taking some steps to review this issue prior to its failure in March 1999. The Commission is of the view that the non-arm's-length relationship between CHBA-BC and NHW played an important role in its failure, as was discussed in Chapter TWO.

> ***Recommendation #44: No developer, builder, contractor, sub-contractor, or sub-trade can invest in a warranty provider. This is to ensure an arms-length relationship between the industry and the warranty providers.***

There is nothing in the legislation to prevent ownership at any level. The only exception is Section 160 (3) of the *Financial Institutions Act*, which deals with applications for business authorizations from out-of-province companies. Under this section, the Minister may make rules if shareholdings exceed 10 percent. However, under the new regulatory environment, and as a result of Sections 144-156 of the *Financial Institutions Act*, which deals with related party transactions, the spirit of this recommendation has been captured.

> ***Recommendation #45: The warranty program should commence on the units, when purchased, but the time limit for minimum coverages not commence until the first meeting of the strata council.***

The Commission's recommendation has not been implemented and the Commission is still of the opinion that consumers should have this protection. The HPO Regulations specify commencement of the plan under Schedule 3, Section 8. Parts 4, 5, and 6.

III. Municipalities

1. Role of Municipal Building Inspectors

> *The Building Code is intended to ensure that health and safety standards for buildings are met, not to guarantee overall construction quality--local governments enforce the standard established in the Building Code--it is unreasonable to assume (given the complexity of a modern building and the volume of new construction in some areas) that an inspector can ensure the quality of every aspect of every structure.*
>
> *Buying a Home: A Consumer Protection Guide*
> *Ministry of Municipal Affairs 1997*

The Commission has accepted the view that it is not the municipality's role to ensure the quality of construction; that responsibility resides with the developer/builder. The developer/builder, in turn contracts that responsibility to the professional architect or engineer. The municipal inspection process is an audit function--albeit an important one--in the sense that a limited number of field inspections are undertaken (formwork, sheathing, framing, insulation, and final). For a building which takes over a year to complete, this could mean an average of five site visits over approximately 3-5 days. Moreover, the design of the building and its building envelope, and ensuring that field reviews take place during construction, is the role of the registered professional (architect and/or engineer). The role of the building official is to monitor these developments.

> ***Recommendation #17: That municipalities should be explicit and give a written statement to all homeowners who inquire, to ensure the exact function (and responsibilities) of their building officials are understood.***

Although there are exceptions, most municipalities do not fully explain the role and function of their building inspectors to consumers.

The role of the municipality in providing inspection services has been defined and redefined on several occasions by the courts. Accordingly, statements as to the role of the municipality provide more of a disclaimer than a clarification of service levels. Given the impact of providing such a statement on future litigation, any such document is normally reviewed by the City solicitor prior to its use. As can be expected, the final product after vetting by the solicitor would be relatively meaningless in the context of your recommendation.

- City of Nanaimo
October 15, 1999

The Commission is still concerned with the lack of understanding on behalf of consumers as to the role and function of municipal inspectors. Consumers expect more than an audit function. On the other hand, municipalities, concerned about liability, are unwilling to provide anything other than an audit function. As a result, the enforcement of the Building Code is lacking.

Recommendation #18: That the Municipal Act be modified to remove the joint and several liability of a municipality while retaining proportionate liability.

Recommendation #19: That the Vancouver Charter be amended to be compatible with the proportionate liability held by other municipalities.

With the liability issue of "joint and several" hanging over municipalities and regional districts, there is a growing trend by these authorities to reduce their plan review and inspection process. In some jurisdictions, contracting out is being seriously considered and in fact, several have implemented partial and even full reduction in the level of service in order to reduce or eliminate liability, simply based on economic decisions.

- Building Officials Association of British Columbia
December 6, 1999

The Commission recognizes a problem with the current situation as municipalities, motivated by valid liability concerns, are not being accountable with respect to their obligation under the *Municipal Act*, which is to enforce the Building Code.

I'm of the firm opinion that the Code is misinterpreted and that the municipalities are not doing their due diligence to the public in administering the Code.

- Pierre Gallant, Engineer
November 1, 1999

Given the extensive number of code violations related to multi-family residential construction presented to the Commission, it is vitally important that municipal officials play a much more significant role in administering and enforcing the Code--this means a greater knowledge base for some officials when interpreting the Code. Such a knowledge base would be co-ordinated through a reinstatement of the Building Standards Branch under the HPO. The connection between some developers, making inappropriate choices for building design, municipal concerns

over liability, and the need for education and training as well as enforcement strength, was addressed by Mr. Tim O'Meara, Chief Building Inspector of the city of New Westminster, on October 26, 1999.

> ***Ms. Allan:*** *...was the knowledge available five years ago if people involved in building homes wanted to seek it out, to build homes that didn't leak and rot?*
> ***Mr. O'Meara:*** *...its the way the industry has developed over the years, and that for the last 10, 15 years, developers are setting up shell companies, and they're calling the shots....For instance...we were concerned about a particular design that they were using....We wrote to them, and asked them to change it, and they refused...*
> ***Ms. Allan:*** *And was there no authority you had to pull their permit?*
> ***Mr. O'Meara:*** *I don't see how I could pull the permit....I could only make a recommendation and that's what I did.*
> ***Ms. Allan:*** *With respect to certain projects, and I know you mentioned that if the liability feature of the municipality was taken away, that inspections would be increased. Is that what you're saying.*
> ***Mr. O'Meara:*** *Yes.*
> ***Ms. Allan:*** *And the result of those inspections would be to ensure fewer building code violations?*
> ***Mr. O'Meara:*** *That's correct....First and foremost is that the Building Standards Branch has to be reinstated with a clear mandate to look at the industry at large.*

Regarding municipal liability for failure to enforce the BCBC, the Commission is of the view that fear of litigation is effectively leading to an inability of building officials to perform their function. The Commission strongly believes that its recommendation concerning municipal liability should be accepted and enacted. That would ensure that municipalities, including Vancouver, would be liable for matters that were their fault but they would not wind up paying large judgments when their degree of responsibility was minimal. On the other hand, the Commission also encourages municipalities to take some responsibility, along with the HPO and the reinstated Building Standards Branch to try to prevent shoddy construction within their boundaries.

It is recognized that the Building Officials Association of British Columbia (BOABC) have, together with AIBC, APEGBC, and the Plumbing Officials Association of BC (POABC), created a joint Building Code Interpretation Committee with invited observers of the Building Policy Branch, HPO and Fire Commissioner's Office. It is important that there be a permanent structure in place, for training and education, and interpretation of the Building Code. That structure is a Building Standards Branch located within the HPO and supported by the Provincial Advisory Council.

As mentioned in the first Commission's report, placing the Building Standards Branch within the HPO would eliminate any concern of potential and inevitable conflict by having two different government administrative services (HPO and Building Standards Branch) with the authority to change and assist in the interpretation of the Code.

Recommendation #20: That municipal councils review their building permit process with a view to enhancing the inspection of work, related to an effective building envelope, and that inspectors become more conversant with the role and effectiveness of building science issues related to the building envelope. The Union of BC Municipalities and the Homeowners Protection Office to provide directives in this regard.

There appears to be an effort to downgrade the role and importance of the municipal inspector rather than improve it. The suggested adjustments regarding liability should go a long way in reversing the current trend.

B. Municipal By-laws and Codes

Chapter THREE on the Building Code noted that the British Columbia Building Code (BCBC) is applied throughout the province, although Vancouver has its own Code, based on the BCBC. In addition, most local governments supplement the mandatory provincial code through their own by-laws; consequently there is considerable variation among municipalities.

Recommendation #10: That all municipalities review their zoning by-laws, and the calculation of FSR, with a view to promoting sound building envelope design practices. In particular the following revisions should be reviewed:

- ***i) FSR calculations to be taken only to the inside face of the principle structural elements of the exterior walls necessary to support the building and the walls;***
- ***ii) exclude from FSR, walkways and top floor balconies protected by roofs; and***
- ***iii) ways and means for promoting overhangs which does not conflict with other municipal planning objectives.***

Many municipalities are reviewing their zoning by-laws and calculation of FSR. The following is a compendium of actions taken, as presented to the Commission during the recent hearings.

The Surrey Zoning By-law currently requires that the FSR calculation be based on the exterior dimensions of buildings. Roof eaves, exterior roofed walkways, and exterior balcony projections are excluded from these calculations.

I have been informed that staff are currently working on amendments to the Surrey Zoning By-law focused on encouraging builders to incorporate improved building envelope designs for the exterior walls. It is expected that the Zoning By-law amendment proposals will be available for Council's consideration shortly. The specific recommendations numbered (i) to (iii) above [the Commission's recommendation] will be addressed as part of this review.

- Mayor D. W. McCallum, City of Surrey
November 15, 1999

i) In Richmond the calculation is applied to the exterior dimension of the foundation wall. As such, any exterior wall component which extends beyond the foundation is not included, this applies to the typical "rain screen design" and also to a conventional designed exterior finished cladding.

ii) An overhang that is not supported by structural members on the exterior side of the overhang, away from the building are not considered in the calculation. With regard to exterior walkways, I previously wrote to the Honourable Jenny Kwan on July 20, 1998, as follows:

> *There is a concern, however, about the recommendation that covered walkways not be included in the FSR calculation. It is the City's experience that developers potentially will take an exemption such as this, as a base for all future building designs. This inclusion of exterior walkways in a building design has in the past not been successfully addressed by architects and builders, and this has resulted in a design feature having a history of water penetration problems.*

iii) Roof overhangs are excluded as part of the FSR calculation.

- Mayor Greg Halsey-Brandt, City of Richmond
October 25, 1999

The Commission concurs with Mayor Halsey-Brandt's reasoning, having initially come to the same conclusions regarding the practice of some municipalities in dealing with exterior walkways and covered balconies in the calculation of FSR. The recommendation should be revised to read: ***ii) include in FSR, exterior walkways and balconies protected by roofs.***

> *We have reviewed various scenarios for allowing overhangs on buildings, one of which falls outside our control. Where a building is built with its front face to the street side property line, even where our Engineering Department would be willing to grant an easement for a projection over the street (as it does on certain commercial buildings), the Strata Titles Act would disallow the projection, as the common property of a strata titled building can not project across any property line. We would recommend that this provision be revisited.*
>
> *- Douglas Watts, City of Vancouver Building Envelope Specialist*
> *November 16, 1999*

Part II - Volume II Recommendation #13: That the provincial government re-examine provisions in the Strata Titles Act which disallows common property extending across a property line.

The City of Vancouver has taken a leadership role on Building Envelope matters related to multi-unit residential construction. They have implemented mandatory rain-screen walls in their Building By-Law for new construction and repairs. While the Commission is not in agreement with their specific initiative for reasons outlined in Chapter THREE, their efforts should be acknowledged and commended for attempting to bring greater accountability into the building industry.

The HPO has informed the Commission that the publication, "The Best Choices Guide on Land Use Planning and Weather Protected Buildings," (May 1999)--a land use guide which explains the relationship between planning and zoning and how that impacts on good design--had been widely distributed and a numoer of municipalities are beginning to implement these guidelines.

Recommendation #21: That municipalities waive building and permit fees on repairs related to building envelope.

Quite a number of municipalities in the lower mainland and Victoria have waived building permit fees on reconstruction projects.

Chapter SIX

Health Issues

I actually had severe sinus involvement and severe head pain. It feels like you have a boil or an abscess in your head. My nailbeds in my feet were affected by fungus. I had lesions on my feet, the soles of my feet. I had abscessed gums in my mouth, and in the bone....and upper respiratory infections for two winters, which put me in bed for several weeks, with chest involvement. And that was severe bronchitis, almost pneumonia.

- Sandra Roth, Condo Owner
December 9, 1999

...when people start doing the remediation work within their homes, this is where you can potentially release a large amount of fungal spores, which are basically abnormal agents which can interact with your lung tissues and cause an allergic reaction.

- Dr. Chris Van Netten, Toxicologist
December 7, 1999

Faced with costly and complicated repair options, most strata councils struggle with remediation choices. Owners of leaky condo units must wait for repair work schedules and strategies to be adopted by their neighbours--many of whom may live in perfectly dry and safe units elsewhere in the complex. It is clear that a delay in remediation work only increases the opportunities for toxigenic moulds to grow. The Commission has heard frightening stories of personal health consequences from residents whose exposure to these moulds has seriously and permanently impacted their own health or that of their family members.

It is important to note that most people seem quite tolerant of exposure to typical mould growth, and can even withstand exposure to higher levels of fungal growth for modest periods of time. However, the evidence presented to the Commission suggests that exposure to some moulds represents a serious risk for all people, especially "at risk" categories such as the very young, old, or those with immuno-compromised health status. These people should avoid exposure to prevalent toxigenic moulds.

Health issues related to mould and leaky condominiums are only now coming into focus--too late for many individuals, such as Ms. Sandra Roth, quoted above. In a paper presented to Vancouver's building industry community by Mr. M.D. Lawton of Morrison Hershfield in early 1999, evidence was tabled detailing the severity and frequency of dangerous moulds found in leaky condominium buildings.

Because of our past experience with mould research, we were well aware that the same conditions that lead to wood rot would very likely lead to the growth of toxigenic moulds. We established a policy of collecting samples of mould growth

found in test openings. The results have not been comforting. Toxigenic species including Stachybotrys chartarum (atra), Aspergillus versicolor, and Trichoderma harzianum have been identified in a high proportion of the bulk samples we have collected since instituting the policy.

Health Canada has taken a leadership role in protecting some Canadians from exposure to toxigenic moulds in British Columbia, but this assistance has been limited to some first nations reserves on Vancouver Island. It is clear that concern for the health of residents and workers repairing leaky condominiums, is an urgent and compelling public health issue that deserves immediate and comprehensive action by Canada's health and safety community.

As practitioners we are in need of rational guidance on evaluating degree of concern and the appropriate methods of addressing the real risks. This needs better risk evaluation and research on the effectiveness of alternate methods of isolating and cleaning up toxigenic moulds.

- Mr. M.D. Lawton, Morrison Hershfield, 1999.

A. Dealing with Mould

Tenants and homeowners are generally familiar with modest problems arising from damp or humid conditions that spawn the growth of moulds or fungus. In a publication entitled "Indoor Air Quality," the B.C. Ministry of Health provides the public with advice on dealing with moulds and other biological contaminants. The following tips for controlling mould growth need to be set against the very abnormal circumstance of life inside a leaky condominium:

i) Repair all internal and external leaks promptly and permanently.
ii) Clean and disinfect all smooth surfaces where mould is present using a solution of 1 part household bleach to 10 parts water.
iii) Clean and dry water damaged carpets, underlay and building materials within 24 hours or consider removing them.
iv) Throw out contaminated porous materials such as mouldy ceiling tiles, mildewed carpets, drywall, etc.
v) Stop stagnant water collecting around heating ventilation and air conditioning system parts.

This Ministry document is currently being used by municipal health officers, to advise concerned condominium owners. While this advice might seem helpful in normal circumstances, it seems woefully out of place when set against the real life experiences of many condo owners:

And when I moved in, it was just a couple of weeks later that water was pouring down my front hall, and I've had, like, seven major leaks into my new town house. Water was coming down the front hall, which is a very high ceiling, and it was not just a trickle, it was pouring down. That was one of them. And then up on the landing of the stairwell, which turns, I've had about seven huge water marks

there, with a buckled wall. And into my bathroom, over the course of time, they had to cut away my ceiling, and remove part of the ceiling because water was dripping into a bucket through the bathroom. There was water coming in my kitchen around the stove, which I reported on the one-year inspection, and was told just to forget about it.

- Sandra Roth, Condo Owner
December 9, 1999

If dealing with mould can be considered a challenge for condominium owners and their strata councils, the same can be said for the construction industry, the remediation companies, construction workers and indeed, for governments at all levels. Part of this challenge stems from the intensely detailed scientific understanding required to correlate the presence of moulds with human health and the fact that most research conducted in this area is less than a decade old.

In June 1995, the Environmental Health Directorate of Health Canada published "Fungal Contamination in Public Buildings: A Guide to Recognition and Management." This report was the result of work conducted by a federal-provincial task force. The impetus for this study came from the provincial government in Prince Edward Island, (there were 11 members of this task force--4 representing Health Canada; none from British Columbia).

This groundbreaking Canadian report was the first to consider fungal growth in public buildings, assess health risks; and suggest possible management strategies. Although the focus of their study lay in the issues around public buildings, the work directed their investigations to water-damaged buildings--clearly relevant for condominiums.

In this protocol, special attention has been placed on the toxigenic fungus Stachybotrys chartarum (atra), which is frequently isolated from water-damaged buildings in Canada. It is recognized that fungi can cause a spectrum of illnesses in humans, ranging from rhinitis to invasive diseases. If associated with fungal contamination of buildings, relatively well defined diseases are considered "building-related illnesses". The extent of the human health related illnesses linked to fungal growth is nothing short of alarming. The list compiled in this study reads:

Other adverse human health effects from mycotoxin inhalation, documented in uncontrolled case reports, include renal failure, tremorgenic encephalopathy, and organic dust toxic syndrome. Living in a damp and mouldy home has been associated with non-specific complaints such as headache, sore throat, alopecia, flu symptoms, diarrhea, fatigue, dermatitis, malaise, cough, rhinitis epistaxis, and fever.

Epidemiological studies from several countries have demonstrated associations between questionnaire-reported mould growth in the home. This finding has been remarkably consistent across different climates, societies, housing characteristics and scientific investigators.

In the few years since the Federal Government commissioned this seminal work, there has been further research and evidence that Health Canada takes the findings to be real and not simply alarmist.

It is very important to note that Health Canada's concern extended beyond the health of the residents and addressed the health of those working on repairs. Not surprisingly, the risks of exposure increases dramatically when walls are removed--disturbing the mould and releasing the spores. In preparation for repairs conducted by the Federal Government on these homes, the First Nations Environmental Health Services branch of Health Canada issued "Recommended Interim Health & Safety Guidelines for Protection of Workers During Mould Remediation and Clean-up in Residential Homes."

In a prelude to the safety protocols recommended by these guidelines, there are certain "basic requirements" that serve as a signpost for construction workers involved in these projects:

> *"No worker who has any sort of immune suppression, asthma or mould allergy should work at mould clean-up, as the risk of serious reactions in the event of inadvertent exposure is too great. Any worker who has recently had a severe cold or flu should delay working in mouldy areas until fully recovered."*

Dealing with mould in leaky condominiums is a matter of urgent necessity, requiring great care to protect the health of workers and residents.

B. Evidence Of Health Consequences for Condo Owners

The Commission has heard from a small number of condominium owners whose health has suffered while living in a leaky condo. Indeed, the Commission has heard testimony from the very "at risk" individuals that scientists have suggested are most vulnerable. These are the very old, immune suppressed, and from parents with infants suffering serious and possibly permanent health consequences from exposure to mould.

The Commission has also reviewed media coverage of the "leaky condo epidemic" capturing the mould-related health issue. The science underlying these stories could not be more straight forward. Damp--not just wet--environments act as breeding grounds for mould. With thousands of leaking condominiums in British Columbia, the severity and frequency of this infestation could not be more certain.

It concerns the Commission that prudent and prompt action is not being taken by some strata councils to address mould-related repairs. We have heard a variety of explanations:

1. Lack of Awareness

Even visible mould can be of a type and quantity to present no particular danger to residents. This does not mean the mould should be ignored--but helps explain the complacency of strata councils to a problem that is of greatest concern to only a fraction of the population. This

problem stems from mould that is usually hidden from view (between wall cavities), and is, ironically, of greatest potency once repairs are underway.

2. Collapse of New Home Warranty

The cost of repair work to strata councils has escalated dramatically for the vast majority of leaking condominiums--those whose warranty protection from New Home Warranty has proven to be of marginal value. Strata Councils that are now facing the full brunt of repair costs have found themselves struggling to assemble the necessary resources.

3. Cadillac versus Band-Aid Repairs

As strata councils research the repair options, they typically receive a very wide range of solutions--detractors calling minimalist options "band-aid," and most costly options "cadillac." While every circumstance is different, it is clearly the case that more minimalist repairs tend to leave as much of the existing structure in place as possible and, indeed, much of the hidden mould stays hidden. While the Commission is not sufficiently informed to know how or whether such "solutions" pose health risks to occupants, the possibility clearly exists.

4. Bad Publicity

The Commission has heard and seen evidence that suggests that some condo owners come under pressure from their neighbours to keep quiet on the matter of mould problems. Just as one might have been told many years ago not to "air your dirty laundry," condo owners may be encouraged to bury bad news that would diminish the property values of other condo owners.

One source of evidence which suggests this inclination to keep matters quiet comes from correspondence with municipal Environmental Health Services. The Commission wrote to a number of such Services in the Lower Mainland. In a response from Simon Fraser Health, a breakdown was provided on the number of Indoor Air Quality concerns that had been registered over a two-year period. Of the 178, only 11 related to leaky condos. *"It should be noted that the large majority of IAQ complaints received were from tenants of rental housing units rather than from home or condominium owners."*

C. CMHC's Role

The Commission has taken particular interest in Canada Mortgage and Housing Corporation's involvement in issues related to mould. For more than twenty years, CMHC has positioned itself as an expert on the subject, and has produced numerous publications and continues to fund research on aspects of remediation in buildings where mould is certain to be present. In addition to this educational and research role, CMHC's link to other aspects of this issue are:

i) as a builder of multi-family structures in the Lower Mainland that have suffered building envelope failure;
ii) as the mortgage guarantor enabling condo-owners to purchase units with only 5% down payment;

iii) as the mortgage holder on social housing co-operatives in the Lower Mainland including buildings that have suffered building envelope failure; and
iv) as the builder of housing stock on Vancouver Island Reserves that required extensive mould-related repairs;

Clearly, CMHC has been part of the solution and part of the problem.

Jim White, Senior Adviser, Building Science, CMHC, presented a paper entitled *"Moldy Houses Can Be Deadly"* to the 1997 ASCP Convention and Exhibition.

CMHC has been studying moisture and mold problems in houses for about 18 years now. Initially we were not sure of a health connection. Our work with Health Canada has removed our doubt of a connection. Our work with Agriculture Canada with one of the leading experts on toxic molds has removed doubts about why.

Mr. White detailed CMHC's concern with mould by noting research that has determined a 50 - 100 percent increase in respiratory disease among populations living in homes reporting moisture or mould. As per the precautions taken during remediation work on Vancouver Island Reserves in 1998, Mr. White notes that workers who are ill or immune deficient when exposed to mould can become permanently disabled.

Given this leadership role in researching and communicating mould-related issues in Canada, it is reasonable to expect that CMHC would have, and should have, played a visible and constructive role in helping British Columbians deal with mould-infested leaky condominiums.

One of the hotly-contested facts debated before the Commission has been the date at which various players in the construction sector knew of the leaky condo problem; what they did with that knowledge; and what actions, if any, were taken.

On December 2, 1999, CMHC hosted a major seminar workshop in Vancouver entitled *"Advanced Construction Details, A one-day, hands-on event with the foremost building envelope experts with a focus on Multi-Unit Wood Frame Construction and Repair."* An answer to the question of when CMHC was aware of the leaky condominium crisis was given to the delegates attending this event by Mark Salerno, CMHC Senior Consultant, Research & Technology Transfer. Mr. Salerno was the first presenter at this conference. His presentation was entitled, *"CMHC Research Leaky Condos, Emerging Crisis."* In 1993, CMHC completed construction of an assisted housing initiative--Kitsilano Project. In 1995, remediation work was started--the wooden studs having already rotted. Mr. Salerno acknowledges that, by this point in 1995, there was an "emerging crisis."

Although it had been two years since the Vancouver Sun had published Ben Parfitt's 1993 series *"Rotten to the Core,"* CMHC discovered the emerging crisis when its own building experienced envelope failure within two years of construction. At that point, once the crisis had been acknowledged, CMHC formed in British Columbia the Building Envelope Research Consortium. But while CMHC earns credit for initiating this valued contribution to restoring confidence in the

building community, it must be noted that a different story was played out for ordinary condominium owners.

By 1995, Vancouver was awash in leaking condominiums--under repair, awaiting repair, covered in tarps. Three years later, CMHC was still routinely approving the 5 percent down mortgage guarantees from couples such as Dawn and Michael Schumacher. In a series published by the Vancouver Province in May 1998, staff reporter Clare Ogilvie interviewed the young couple.

> *The Schumachers took advantage of CMHC's five per cent down offer to buy their Burnaby condo three years ago. Shortly after moving in, they began to suffer cold-like symptoms--coughing, sneezing and ticklish throats. The culprit was the mould stachybotrys atra, growing in the walls of their leaky home.*

The extent of the "emerging crisis" could not have been more clear once CMHC completed and published the survey, "Building Envelope Failures in the Coastal Climate of BC in 1995." Marc Salerno was asked, in 1999, by one condo owner to detail the CMHC's response to the leaky condo crisis. In Appendix One of his October 26th reply to Carmen Maretic he states:

> *Although CMHC had undertaken research on moisture problems in Canadian housing prior to that time (1995), it was the results of this specific study which stated the reasons for the problem, and gave clear recommendations on what action steps should be taken. For example, until this study was completed it was not known that almost all of the problems related to moisture problems in BC were due to water entering from outside the building and not from the diffusion of moisture from inside the home.*

With full appreciation of the extent of the "emerging crisis," it is reasonable to expect that CMHC would do more than conduct business as usual. In fact, for consumers, that was exactly how CMHC responded. As it had for many years, CMHC went about its business, publishing pamphlets, booklets and videos on various aspects of home ownership:

> Removing Ice on Roofs, about Your Home Series CE15 1999
> Floods - What to do Before and After: Self Help Advice 1997
> Fighting Mold. About Your House Series CE8 1996
> After the Flood. A bout Your House Series CE7 1996
> Measuring Humidity in Your Home: Do you have a humidity problem? 1996

CMHC's Senior Consultant, Research and Technology Transfer, describes CMHC's view of the building envelope failures in British Columbia as being, in 1995, **"an emerging crisis."** CMHC Senior Adviser, Building Science delivers a paper to an international conference titled, *"Moldy Houses Can Be Deadly."* It seems more than reasonable to suggest that once CMHC started using terms like **"crisis"** and **"deadly"** to describe a circumstance faced by thousands of Canadians living in leaky condominiums--homes that were typically purchased with CMHC approved high-ratio mortgages--it was time for something other than a business-as-usual response.

Dr. Chris Van Netten, a professor of toxicology at UBC--and a member of the Mould Advisory Committee that studied and recommended procedures followed in the repairs to homes on native reserves on Vancouver Island in 1998--appeared before the Commission on December 7th.

> ***Ms.Allan:*** *Now, if repairs are being undertaken in a multifamily residential building, what -- what would you recommend to homeowners?*
> ***Dr. Van Netten:*** *I would depending on the extent of the repairs. You can do it by -- room by room, for instance, which means people can literally move out of one room and go somewhere else. If the whole structure is an open type of structure, I would really suggest they literally move out, especially when the renovations are occurring on the inside of the building. On the outside of the building, you have to sort of use your own judgment in respect to how much interaction there is between the air on the outside compared to what you do on the inside. If your windows are open and people are working on the outside, you have a problem. But if you can close them, then you can probably stay inside without having to worry much about it. But if there is definitely work going on inside the building, where the Gyproc walls are being taken out, etc., I would suggest you move out of there.*
> ***Ms. Allan:*** *That you move out of your home?*
> ***Dr. Van Netten:*** *Move out of the home.*

CMHC is familiar with the work of Dr. Van Netten, and endorsed the recommendations of the Mould Advisory Committee on which he served vis-à-vis the first nations' housing repairs, where at-risk populations were moved during repair work.

It is the opinion of the Commission that CMHC has informed itself of the health risks associated with mould in leaky buildings in British Columbia and is aware of the extreme caution required in the management of toxigenic moulds. What has been missing from CMHC is a credible response to the self-described "emerging crisis" for condo owners in British Columbia.

D. Health Canada's Role

The Commission appreciates the assistance from Health Canada's Vancouver based staff. In particular, we appreciate the significant original research compiled by Dr. David Martin, Programs Medical Officer, Aboriginal Health, which was supplied to the Commission.

Assistance from Health Canada's head office has been less forthcoming. Efforts to schedule an appearance by someone representing this federal department failed. Letters were sent. Phone calls were made.

There is little doubt that Health Canada has a role in issues relating to indoor air quality. From the Department's website we learn:

> Because *of the potentially adverse effects to human health resulting from*

exposure to pollutants in the home, the "Exposure Guidelines for Residential Indoor Air Quality" were developed.

In Canada, no single agency or organization has sole responsibility for investigating and controlling the potential health impact of residential indoor air pollutants. Moreover, in the case of residential buildings, involvement by government may, on one hand, be viewed as an intrusion, and on the other, as a necessity. There are a number of national agencies in Canada that have a role to play in this regard. These include:

* *Health Canada*
* *Environment Canada*
* *Public Works and Government Services Canada*
* *Natural Resources Canada*
* *Agriculture and Agri-Foods Canada*
* *Canada Mortgage and Housing Corporation*
* *National Research Council of Canada, Division of Building Research*
* *Housing and Urban Development Association of Canada*
* *Canadian General Standards Branch.*

Health Canada has been unwilling or unable to clarify what, if any, actions it has taken to address the obvious health-related concerns arising from British Columbia's leaky condo crisis. Health Canada played a very significant role in the crisis surrounding urea formaldehyde foam insulation in 1980. Like others, the Commission has heard suggestions from Health Canada about the importance of taking a more pro-active health promotion posture. If Health Canada had taken any action in regard to the plight of leaky condo owners, we would have heard about it. It is a matter of regret to this Commission that Health Canada did not take the opportunity to assist this Commission and, through that, help consumers.

E. WCB Role

Just as residents are most exposed to the health risks associated with fungal growth during periods of remediation, the risks to construction workers are also of great concern. The Commission has heard from the Workers Compensation Board, the Carpenter's Union, and other representatives of the labour movement in British Columbia.

Kent Hillman appeared before the Commission on behalf of WCB. Although it is WCB's belief that existing regulations provide sufficient protection for workers in the near term, the Board agrees that more information is needed.

> *What we're finding is that , like the rest of the world, we're trying to learn about this stuff, and we have some generic practices here that do protect people in the practical sense, and we do have a research project that*

we've recently approved. It's a joint research project with UBC (Dr. Van Netten), and the Carpenters Union, local 1995. And that's going to be a very interesting project because it's really going to go out into building exposures and symptoms, and do a lot of air sampling and that kind of thing. That, hopefully, will bring us back some better information on the BC environment related to mould and fungus contamination and the health risks to workers.

As noted by Mr. Hillman, one of the sponsors of research on this issue has been the Carpenters Union. Bill Duncan appeared before the Commission on behalf of this union and it should be noted he also serves on a number of industry/government committees addressing aspects of the leaky condo crisis.

Mr. Duncan makes a compelling argument that sufficient evidence of risk associated with mould-related repairs justifies an abundance of caution. Although the union is to be commended for initiating its own training programs for its membership on health and safety aspects of working on repairs to leaky condominiums, the Commission would like to see the Workers Compensation Board step up their own response by increasing the frequency of visits by WCB staff to condominium repair sites.

Part II - Volume II Recommendation #14: The Workers' Compensation Board increase the frequency of site visits by WCB staff to condominium repair sites.

Assessment of on-site risk is an important element in worker protection. To support hazard assessment of biological contaminants, the Commission recommends some amendments to the relevant regulations.

Part II - Volume II Recommendation #15: That WCB regulations governing hazard assessment of biological contaminates and work procedures be amended in Book 2, Part 9 of the Occupational Health and Safety Regulation Book - BC Regulation 296/97. The revised guidelines would read:

Hazard Assessment of Biological Contaminants and Work Procedures for Building Envelope Restorations:

9.9 (1) (a) A hazard assessment of biological contaminants must be conducted for each building envelope restoration or each group of living units located within a building envelope restoration, and;
(b) Work activity or group of work activities that present similar hazards to be performed inside or outside the affected housing units of a building envelope restoration project.

9.9 (2) The hazard assessment of biological contaminates required by Subsection (1) must consider
(a) the conditions which may exist prior to entry caused by the design, location or use of the dwelling, or which may develop during work activity inside or outside the dwelling, and
(b) the potential for toxic microbial substances or other hazardous atmospheric particulate and related harmful substances which may put a restoration worker, technical consultant, or dwelling occupant at risk of exposure.

9.10 (1) The hazard assessment of biological contaminates and biohazard removal procedures must be prepared
(a) by a qualified person who has adequate training and experience in the recognition, evaluation, and control of toxic microbial biohazards, and
(b) in consultation with the person assigned overall responsibility for administration of building envelope restoration program and with the occupational health and safety committee, if any, or worker occupational health and safety representative, if any.

(2) For the purposes of Subsection (1) (a), qualifications which are acceptable as evidence of adequate training and experience include:
(a) certified industrial hygienist (CIH) or registered occupational hygienist (ROH)
(b) professional training in a closely related field, provided that the holders of these qualifications have experience in the practice of occupational hygiene as it relates to the assessment of biological contaminates found in the above-mentioned settings;
(c) other combination of education, training, and experience acceptable to the board

Chapter SEVEN

Summary of Recommendations

Part II - Volume II Recommendation #2: The Homeowner Protection Office, with the support of the Provincial Advisory Council, to provide the leadership for minimum mandatory education for multi-family residential design and construction. Such education to include the testing of architects, engineers, and registered builders, regarding the basics of building science and interpretation of the BC Building Code and Vancouver Building Bylaw.

Part II - Volume II Recommendation #3: That the provincial government through the Industry Trade Apprenticeship Commission (ITAC) tighten up on apprenticeship ratios to offer the best training possible to residential construction workers. Related to this area is the requirement for a proper and effective trades training system.

Part II - Volume II Recommendation #4: That the provincial government bring in adjustments to the Corporation Capital Tax Act so that a dedicated revenue amount of $30 million ($10 million per year over three years) be obtained from financial institutions for financing the Research and Education activities of the HPO. It is further recommended that this fund be used as a capital fund and the interest earned each year be allocated to research and education as set forth by the Provincial Advisory Council.

Part II - Volume II Recommendation #5: The provincial government create a Housing Ministry responsible for BC Housing, housing policy, residential construction, the Homeowner Protection Office, building standards, and the BC Building Code.

Part II - Volume II Recommendation #6: A Legislative Select Standing Committee be established to review, annually, for the next five years, all housing issues.

Part II - Volume II Recommendation #7: The Superintendent of Bankruptcies Office classify leaky condominium foreclosures with a maximum rating of six or under which avoids employment jeopardy as a result of a foreclosure.

Part II - Volume II Recommendation #8: That the mandatory repair warranty program include roofs in the definition of building envelope and that the repair program include 10-year warranty for structural repairs.

Part II - Volume II Recommendation #9: That the provincial government amend the Real Estate Act to require the conditional licensing of multi-family developer sales personnel.

Part II - Volume II Recommendation #10: that PDS be amended according to the HPO requirements, and that they become mandatory under the Real Estate Act. They should also include the requirement that a property cannot be sold unless both parties to the sale complete and sign the document.

Part II - Volume II Recommendation #11: That the HPO establish a Condominium Homeowners Office to administer the Strata Property Act and provide services to condominium homeowners in an effort to redress the imbalance created in the market place between developers and consumers.

Part II - Volume II Recommendation #12: That FICOM--in co-operation with HPO--establish regulatory reviews on underwriting practices, claims handling, price determination, and other important criteria such as corporate guarantee requirements, together with the current financial criteria, to ensure the integrity of the warranty market.

Part II - Volume II Recommendation #13: That the provincial government re-examine provisions in the Strata Titles Act which disallows common property extending across a property line.

Part II - Volume II Recommendation #14: The Workers' Compensation Board increase the frequency of site visits by WCB staff to condominium repair sites.

Part II - Volume II Recommendation #15: That WCB regulations governing hazard assessment of biological contaminates and work procedures be amended in Book 2, Part 9 of the Occupational Health and Safety Regulation Book - BC Regulation 296/97. The revised guidelines would read:

Hazard Assessment of Biological Contaminants and Work Procedures for Building Envelope Restorations:

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(a) certified industrial hygienist (CIH) or registered occupational hygienist (ROH)
(b) professional training in a closely related field, provided that the holders of these qualifications have experience in the practice of occupational hygiene as it relates to the assessment of biological contaminates found in the above-mentioned settings;
(c) other combination of education, training, and experience acceptable to the board

APPENDIX I

Submitters' List

SUBMITTER'S NAME	
Amundson	George E.
Anderson	Ken
Armstrong	Milton
Arrani	Fina
Bailey	Lloyd
Bain	Nancy
Baker	Susan
Balderson	James
Baldock	James
Barker	Larry
Beasley	Larry
Beaucage	Suzanne
Beauprie	Mrs. Laurie
Beilstein	Irene
Boellaard	J.H.
Bond	Janine
Boon	John
Bowen	Robert
Bower	Richard
Boyd	John & Marjorie
Boyes	M.
Brodie	Charles
Brown	Keith
Burke	Muriel
Buttress	Larry
Carter	F.H.
Carvalho	Patricia
Charleston	Alan
Cherrier	Alan
Chin	Albert
Clark	Brian & Isobel
Cochran	J. Paul
Coleman	Maurice
Courtney	Mona & Ken
Craib	Phyllis
Cranna	Carla
Crawford	Gloria
Crocker	Grant
Currell	Elizabeth
Currie	Jim
Curtis	Vicki

SUBMITTER'S NAME	
Daniels	Greg
Davel	Kirsten
David	Danielle
Davies	Helen
Davis	Wayne
Deans	Olga
de Jong	Carl
DesRosiers	Cindy
Devine	S.M.
Dexter	Barb
Dick	Bill & Millie
Dieno	R.R.
Dollman	Elbie
Doyle	Graham
Dubnov	Martin
Duncan	Cathy
Dybvig	Larry
Ebenal	Deborah
Egles	Shirley
Enser	Maureen
Etter	Alison
Eylmann	Rudy
Fee	Gary
Firth	Judy
Fletcher	Nigel
Fong	Susan
Forcier	Doreen
Fournier	Sid & Dorothy
Galt	William & Renee
Garrett	Sharon
Gaughan	Mark
Goebel	Sibylle
Good	Jeanne
Gourley	Brian
Grasty	John
Griffiths	W.F.
Guenther	John
Gustavson	Mel
Haegedorn	Sheila
Hale	Colette
Harrington	Gavin

Submitters' List

SUBMITTER'S NAME	
Healey	Dan
Henders	Stephanie
Hillman	Kent
Holloway	Clifford
Holt	Simma
Hoogewerf	Joan
Hosken	Marjorie
Hull	Wanda
Hunter	Henry
Huntingford	David & Natalie
Huntingford	Wendy
Ismael	Karim
Johnstone	Bruce & Eleanor
Kelln	Kathryn
Kelly	Frank B.
Kirby	Enid
Krall	Trudy
Kuhn	Robert
Kuresh	Mr. & Mrs.
Krvavac	Janet
La Couvee	Sandra
Langan	Peter
Law	Winnie Sui Wah
Limmert	Gale
Link	Peter
Livingston	Ed
Lo	Betty
Loucks	Jeff
Lund	Anna
MacFarlane	Olive
Main	Stella
Maretic	Carmen
Marphis	Louise
Martens	Martin
Martin	Eric
Martin	Marion
McDonald	Darryll
McDonald	Ralph
McFadden	James
McKay	Brian
McKenzie	Jim

SUBMITTER'S NAME	
McMullen	Donna
McNeil	K.
McPherson	Peter
McWilliams	Eleanor
Meln	Mel
Menard	Sandy
Mielke	Richard (Dick)
Milne	Kay
Minty	Isobel
Mitchell	David
Morgan	Edward
Morris	Brent
Muise	Laura
Murphy	John
Murray	Adrienne
Murray	J.M.
Naumann	Uwe
Neale	Derek
Neilsen	Larry
Nelson	Keith D.J.
Neun	Heather
Nisbet	Sue & Lorne
Noel	Marc
Ohrling	Finn
Olson	Paul
O'Meara	Tim
Parfitt	Ben
Paulson	Val & Bruce
Pecnik	Hilda
Plett	Irene
Rasilainen	Jan
Reimer	David
Rice	Teresa & William
Robinson	Gary
Robson	Donna
Roth	Sandra
Russell	Jack
Salusbury	Pamela
Sargent	Rick
Sargent	Rick
Saxvik	Christian

Submitters' List

SUBMITTER'S NAME	
Schettler	Carolyn
Seow	Doreen
Sheppard	Dick
Shirra	Robert
Simmon	Eric
Smart	Bill
Smith	Kelvin
Smith	Terry
Stevens	Jeff
Strain	William
Sutter	Rory
Tennant	Elizabeth
Tombrink	Bill
Toth	Sandra
Tsamura	Ed
Turner	G.A.
Tweed	Brian
Utley	Patty
Van den Hemel	Martin
Van der Holt	Ron
vander Mey	Jerry
Verge	David
Wahl	William
Wain	Lucille
Walton	Doug & Tammy
Warfield	Diane
Weir	G.E. (Mrs)
Weisz	Iolanda
Whaley	Larry
White	Gordon
Wilkinson	David A.
Williams	Roger
Willoughby	Norman
Wood	Dale
Zeiger	Kris
Zimmer	Maureen

Submitters' List

Organization	Representative	
Anson Realty Ltd.	Chateauneuf	Alain
Applied Science Technologists & Technicians of BC	Leech	John
Archtectural Institute of BC	Davidson	John
Association of Professional Engineers & Geoscientists of BC	Sunderland	Philip
Bank of Nova Scotia	Mariatte	George E.
Barclay McLeod, Architects	McLeod	Barclay
Baywest Property Management Services	Cartmel	Phil
BC & Yukon Territories Building Trades & Construction Council	Sigurdson	Tom
BC Building Envelope Council	Morstead	Tom
BC Building Science & Engineering	Moskalyk	Steven
BC Construction Association	Fulton	Abagail
BC Provincial Council of Carpenters	Duncan	Bill
BC Real Estate Association	Watt	Dave
BC Society of Landscape Architects	Wilson	Andrew
Building Envelope Research Consortium	Hazelden	Don
Building Officials' Association	Bortolussi	Rick
Busque, Perreault & Assoc.	Busque	Pierre-Michel
C & J Restoration	Sheloff	Joan & Cecil
Canada Mortgage & Housing Corporation, BC & Yukon Region	Lynch	Jim
Canadian Bankers Association	Griffin	Paul
Canadian Home Builders' Assn	Penzer	Doug
Coalition of Leaky Condo Owners (COLCO)	La Couvee	Sandra
ColyVan Property Services Ltd	Bebb	Trevor
Condominum Home Owners' Association	Saunders	Nona
CONDUITS	Murphy	John
Consulting Engineers of BC	Williams	Doug
Co-Op Housing Federation of BC	McMeekin	Ian
Co-Ops, Housing - Kitsilano Terrace	Hunter	Shirley
Co-Ops, Housing - Rising Star	Halliday	Richard
Coquitlam Town Centre Assn	Friesen	Claudette
Crawford & Associates, Barristers & Solicitors	Crawford	Glen
Credit Union Central of BC	Nygren	Wayne
DFH Real Estate	Wheaton	Robert
Discovery Economic Consulting	Young	Geoff
Evanic Perrault Robertson, Certified General Accountants	Chisholm	Bruce
Fraserway Appraisal Ltd.	Kobelsky	Brian G.
GE Capital Mortgage Insurance	Machej	Ed
Glaziers Union, Local 1527	Byrne	Pat
Financial Institutions Commission	Hobart	Robert
Homeowners Protection Office	Ramsay	Shayne
Government of British Columbia, MLA, Burnaby-Edmonds	Randall	Fred
Government of British Columbia, MLA, Nanaimo	Lovick	Dale
Government of British Columbia, MLA, Nelson-Creston	Evans	Corky
H. Niezen Inspections	Niezen	Henry
Harbour Homes Ltd.	Kuhn	Egon
Health Canada	Dodge	David
Henshaw Kjellbotn & McKinley, Chartered Accountants	McKinley	Reg
Highland Contracting & Services	Veaton	Lawrie
Independent House Diagnosis	Riley	David
Insurance Dispute Resolution Services of BC	Wright	Peter

Submitters' List

Organization	Representative	
International Brotherhood of Electrical Workers, Local 213	Thompson	David
International Manufacturers Warranty Systems Ltd.	Naismith	Ian
KPMG Inc. Trustee in Bankruptcy	Rusko	Robert
Lesperance, Mendes & Mancuso, Barristers and Solicitors	Mendes	John
London Guarantee Insce Co.	Petropoulos	George
Mandate Group Realty Corporation	Farrington	Ronald
MH Financial Consultants Ltd.	McCreath	Fred
Ministry of Social Development and Economic Security	Thompson	Bob
Morrison Hershfield Ltd.	Gallant	Pierre
Multiple Warranty Services Inc.	Stolz	K. Greg
Nanaimo, City of	Mehaffey	Brian
National Home Warranty Programs	Morris	Jim
National Research Council of Canada	Chown	Adaire
Nelson, City of	Exner	Gary
New Home Warranty	Moore	Ralph
New Home Warranty (former Chair & CEO)	Thomson	Jim
New Westminster, City of	Puckmayr	Chuck
North Shore Credit Union	Milner	Jane
NorthWest Occupational Health & Safety	McManus	Neil
Oak Ridge National Laboratory	Karagiozis	Dr. Achilles
Operative Plasterers' and Cement Masons' International Assn Local 919	Morgan	Darcy
Osmose, Inc., Wood Preserving Division	Wangel	Robert K.
Pacific Wood Preservation	Hollick	Mike
Paterson & Associates, Barristers & Solicitors	Paterson	Craig
Peter-Built Construction	Walsh	Peter
Point Grey Properties	LeSage	Stephen
Polygon Homes Ltd.	Genest	Richard P.
Powerline Group	McIsaac	Deborah
Preferred Group of Companies	Hatala	Wayne
Pre-Paid Legal Care of Canada	King	Tim
Professional Association of Managing Agents	Wunderlich	Mike
Professional Strata Council Consultants Inc.	Williamson	John
Property Inspection Certification Board	Lucas	Lloyd
R.J. Moore & Associates	Moore	Richard
RDH Building Engineers	Ricketts	David
Real Estate Council of British Columbia	Fawcett	Robert
Residential Home Warranty of Canada	Garrity	Gordon
Richmond, City of	Halsey-Brandt	Greg
Strata Council K-1442	Peck	Brian
Strata Council K-748	Dally	Dan
Strata Council KAS 986	Heathcote	Mrs. D.
Strata Council LMS 108	Atherton	Laurene
Strata Council LMS 545	Previer	James
Strata Council LMS 600	Baker	Susan
Strata Council LMS 908	Williamson	John
Strata Council LMS 1046	McKay	Eleanor
Strata Council LMS 1090	Aniba	Bill
Strata Council LMS 1092	Andrews	Sheila
Strata Council LMS 1167	Spark	Roberta
Strata Council LMS 1285	DeBalinhard	Stewart

Submitters' List

Organization	Representative	
Strata Council LMS 1328	Kaye	Geoff
Strata Council LMS 1410	Tomm	Calvin
Strata Council LMS 1436	McFarling	Shane
Strata Council LMS 1672	Bowes	Minna
Strata Council LMS 1699	Ames	Linda
Strata Council LMS 1841	Cybak	Margi
Strata Council LMS 1983	Young	Randy
Strata Council LMS 2219	O'Kane	Bobbi
Strata Council LMS 2332	Vizsolyi	Mike
Strata Council LMS 2430	Wong	Betty
Strata Council NES 122	Doratti	Colleen
Strata Council NW 2737	Zenner	Denyse
Strata Council VIS 1229	Walker	Florence
Strata Council VIS 1606	Jeffrey	John
Strata Council VIS 1864	Bateman	Jean
Strata Council VIS 2613	Featherstone	Frank
Strata Council VIS 2915	Candy	Gary
Strata Council VIS 2951	Thurbide	Cam
Strata Council VIS 3130	Adderley	Doug
Strata Council VIS 3156	Ramsden	Wendy
Strata Council VIS 3442	Krall	Tom
Strata Council VIS 3499	Farough	David
Strata Council VIS 3764	Matheson	Don
Strata Council VR 574	Campbell	Alastair
Strata Council VR 1899	Zeller	Allan
Strata Council VR 1934	Molund	Paul
Stratasphere Condominium Services Inc.	Wilson	Cora
Surrey, City of	McCallum	Doug
Timber Specialties Co.	Baker	Cliff
Township of Esquimalt	Rice	Ray
Union of BC Municipalities	Ranta	P.A. John
United Association of Journeymen and Apprentices of the Plumbing & Pipefitting Industry of the US and Canada, Local 170	Peppard	Wayne
United Brotherhood of Carpenters & Joiners of America, Local 1995	Duncan	Bill
University of BC, Dept. of Civil Eng	Russell	Prof. A.D
University of BC, Dept of Health Care & Epidemiology	Van Netten	Chris, Dr.
University of Waterloo	Straube	Dr. John
Urban Development Institute	Ilich	Olga
Vancouver, City of	Watts	Douglas
Vancouver Condominium Services Ltd.	Fanaken	Gerry
Vancouver Island Strata Owners' Association	Kelly	Frank
Victoria Harbour Residents' Association	MacDonald	Lynn
Workers' Compensation Board	McGinn	Ralph

APPENDIX II

PROVINCE OF BRITISH COLUMBIA

ORDER OF THE LIEUTENANT GOVERNOR IN COUNCIL

Order in Council No. 1055 . Approved and Ordered AUG 11 1999

Lieutenant Governor

Executive Council Chambers, Victoria

On the recommendation of the undersigned, the Lieutenant Governor, by and with the advice and consent of the Executive Council, orders that

1 A Commission be issued under the Great Seal pursuant to section 8 of the *Inquiry Act* appointing David Barrett a sole commissioner to inquire into and report on the matters and in the manner set out in the attached Terms of Reference.

2 The entitlement to reimbursement for living and travelling expenses incurred by the commissioner appointed under section 1 is equivalent to the entitlement approved by Treasury Board for Managerial employees in Group III.

3 Consent is given to the commissioner to appoint clerks and stenographers the commissioner considers necessary for the conduct of the inquiry, and to pay them at rates or salaries that are equivalent to the rates or salaries paid to employees in similar positions in the public service.

4 To assist in achieving the objectives of the inquiry, the commissioner may appoint or retain counsel, research assistants and professional advisers that the commissioner considers appropriate and the rates, fees and expenses applicable to these appointees will be those established by the Attorney General.

5 The commissioner shall receive $725 for each day spent in the work of the inquiry.

Minister of Social Development and Economic Security

Presiding Member of the Executive Council

(This part is for administrative purposes only and is not part of the Order)

Authority under which Order is made:

Act and section: *Inquiry Act*, section 8

Other (specify): o.c. 607/96

August 11, 1999

PROVINCE OF BRITISH COLUMBIA

ORDER OF THE LIEUTENANT GOVERNOR IN COUNCIL

Order in Council No. 2 , Approved and Ordered JAN 13 2000

Lieutenant Governor

Executive Council Chambers, Victoria

On the recommendation of the undersigned, the Lieutenant Governor, by and with the advice and consent of the Executive Council, orders that the Terms of Reference attached to order in council 1055/99 are amended in section 4 by striking out "by January 15, 2000," and substituting "by March 10, 2000,".

Presiding Member of the Executive Council

(This part is for administrative purposes only and is not part of the Order)

Authority under which Order is made:

Act and section: Inquiry Act, s. 8

Other (specify):

January 6, 2000

1968/99/16/ma

PROVINCE OF BRITISH COLUMBIA

ORDER OF THE LIEUTENANT GOVERNOR IN COUNCIL

Order in Council No. - 1238 , *Approved and Ordered* SEP 10 1999

10/9/99
18:00

Lieutenant Governor

Parliament Buildings, Victoria

On the recommendation of the undersigned, the Lieutenant Governor, by and with the advice and consent of the Executive Council, orders that the Terms of Reference attached to order in council 1055/99 are amended

(a) by adding the following section:

2.1 To inquire into the history of home warranties in British Columbia and the causes of the failure of New Home Warranty of British Columbia, Inc., *and*

(b) in section 4 by striking out "by October 29, 1999," *and substituting* "by January 15, 2000,".

Presiding Member of the Executive Council

(This part is for administrative purposes only and is not part of the Order.)

Authority under which Order is made:

Act and section: *Inquiry Act*, section 8

Other (specify):

September 10, 1999

/293/99/13/ak

TOTAL P.02
TOTAL P.01

APPENDIX III

THE BARRETT COMMISSION

PUBLIC HEARINGS

VOLUME 27 B

The Plaza 500 Hotel
Vancouver, British Columbia

November 25, 1999

TRANSCRIPT OF PROCEEDINGS

Dave Barrett	Chair
Peter Leask, QC	Counsel
Robyn Allan	Adviser

COPY

ACCURATE *Realtime* REPORTING
Catherine R. Kottmeier, Official & Realtime Certified Reporter
903 - 1127 Barclay St., Vancouver, BC V6E 4C6
Office & Fax: (604) ***685-6050*** Cell: (604) ***720-6050*** e-mail: catkot@smartt.com

Presentation by Mr. Bob Thompson

November 25, 1999
Vancouver, BC

.....

MR. BARRETT: Good morning. Our presenter this morning is Mr. Bob Thompson, who is the acting director of the Building Policy Branch in the Ministry of Housing in Victoria. I don't think they have a housing ministry anymore, Mr. Thompson. Okay, go ahead. Thank you.

PRESENTATION BY MR. BOB THOMPSON:

No, actually it's the housing division of Social Development and Economic Security, and I was with Municipal Affairs for quite a number of years before that.

Good morning. You have my presentation, and I'm not going to read all of it, but I'm going to read some of it and expand on some of it, and probably skip a few paragraphs in here as well, so...

I wanted to make this presentation because I felt that there was a number of falsehoods and erroneous statements being passed around through the media, mainly in recent weeks, about the building code. It's gotten more a lot of publicity in the last few years than we ever dreamed possible. But certainly lately it's been very negative publicity. And my concern was that a bunch of the information that was out there was, to my mind, wrong, and should be addressed in some form.

There's a number of headings, here, that I've chosen, and these are based on, like I say, media reports, both television, radio, and newspaper that I've seen, and just issues that I felt I wanted to address.

To start off with, what is the building code? I think there's an understandable confusion, to a lot of people, what the building code really is, but basically it's a minimum set of standards for safety and health in buildings. Also, in the recent years, it's dealt with accessibility for people with disabilities. But this basic objective of the code, in health and safety and accessibility, has been around since it was first produced in 1941, and it's a minimum standard, it applies to new construction, to renovation, and to additions, and that sort of thing.

Specifically dealing with the subject of leaky condos, in the area of exterior walls of buildings,

and roofs of course, there are a set of objectives and criteria, in the code, in two areas of the code, that are there to principally protect the structure from deterioration and to provide a healthy environment inside for the occupants.

It's not a textbook in building design or construction. It's a regulation. It sets down, once again, minimum standards for design and construction of new buildings and so on. Designers and builders are expected to know how to design and construct buildings, that's what they do. The code is a book they reference to determine the level of safety and health and accessibility that's required. And it does not attempt to make any regulation on aesthetics or function in the form of: This building was designed for a client, and he had certain requirements of function. That's what the designer is there for, is to figure out how to make it look nice and how to make it function for his client.

There are things that have been discussed, like the code should mandate overhangs and should prohibit certain kinds of designs. Well, I don't think that's a position of the code at all. That's the position of the -- of the professional designer to determine whether an overhang is appropriate or required, and likewise, whether a specific design of building, the so-called California architecture or whatever it happens to be, is appropriate for a given location.

We have all kinds of styles of architecture that have been produced in Canada for many, many years that are not germane to this country, and they've, by and large, been quite successful if they're appropriately adapted to our climate, which vary of course all across the country and all across the province.

Certainly, in some areas, overhangs may be a good idea, certain kinds of buildings, they're appropriate, and likewise the design of the building may need to be adapted. As I said, pure adobe type of structure that would be designed to go in Arizona, is not going to work in Vancouver, but the style of the building could certainly be adapted by using different materials.

The *National Building Code* versus the *BC Building Code*. Here is an area where I know, from many years' experience, there is significant confusion amongst even people who should know. The *National Building Code*, which a lot of people have heard of, is a model document. It's produced by Canadian Commission on

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Building and Fire Codes, a national body, which is appointed by the National Research Council, and under the Canadian Commission are a number of technical standing committees which deal with various parts of the code. This process has been in place since -- since the '50s, and is generally considered to be a good one. The representation on these committees come from all across the country. They produce, like I said, a model document which is intended to be adopted by government. In Canada, that would be mainly the provinces, but there are one or two cities that have the authority to do that as well, including Vancouver.

The makeup of these committees is representative of the industry in Canada. There is a significant matrix for each of these committees, which tries to balance between various specialties in the industry, their association with different sectors of the industry, whether it be design or construction or enforcement or manufacturing, etc., including the -- the consumer interest. The people that sit on these committees come from, as I said, from all across the country. There's been a reasonably significant representation from BC for many, many years. The people are selected for their knowledge and their association with various, like I said, sectors of the industry. They sit as individuals, they don't sit to represent an association. They're chosen for their knowledge, and clearly they want a balance on the committee, that it isn't all building officials or all architects. But they're not there to -- to represent any specific association, they're there for their knowledge, and like I say, to balance out the committees, so that all the views of the industry are presented.

The code is formulated, I guess is a good word, by these committees based on input from code users and from the committee members themselves. Code-change proposals and so on are submitted by code users, whether it be individuals or industry representative associations, to the Commission. Those go through a fairly rigorous review process, and once the -- they've gone through the technical review, they'll go back to the Canadian Commission for approval. The staff of the Canadian Code Centre of the National Research Council do the actual technical writing, but ultimately whatever goes in the code is the result of the -- of the work of these volunteer committees.

Now, that model code is then offered to government. In the case of Canada, all the provinces, and the City of Vancouver, and I believe Montreal, for their adoption as a regulation or by-law. Each province has a slightly different mechanism for adopting the code. In BC, it's done through a minister's order; it's fairly simple. In recent years, British Columbia and some of the other provinces have gone through a second public review of that document, within the province, to determine that the players in the province, who may not participate in the national process, they may feel it's a bit remote from them, are given the opportunity to review the document before it's produced as the British Columbia building code. We first did that in 1985 through '87, which resulted in the 1987 *BC Building Code*. We repeated the process when the 1990 national code came out, and that resulted in the 1992 *BC Building Code*.

Prior to 1985, the code was adopted pretty much as is where is from the national -- from the national model, and there wasn't a -- a significant, if any, provincial process to deal with that.

For what has now become the 1998 *National* -- or *BC Building Code*, which is based on the '95 national model, the public review process was curtailed, a lack of resources basically at a very critical time. The downsizing of the ministry and closing of the Building Standards Branch, which was responsible for administering the code. We had to determine, in fairly short order, how to go about adopting a new -- a new code. The '92 code was in need of updating, and the industry was -- was wanting a new -- the new document. And so we went through an abbreviated public review process, which relied primarily on the principal construction-related associations, which we liaise with on a regular basis to review and give us their comments, and it still took longer than it otherwise would have, and it ultimately resulted in the 1988 -- 1998 BC code.

It is substantially the same as the '95 national code. The previous two BC codes were substantially the same as well. They were tailored, in some cases, for BC. There was also changes that were perhaps just for changes' sake. People in BC thought it should be done differently, and we respected that, and changed the code.

For '95, the decision of the industry was: We need a new code. They decided that the most appropriate way to deal with it was to adopt the new 1995 national code with as few changes as possible. And that's what we did.

The comment has been made recently for a made-in-BC code. And based on what I've just said, my feeling is that it is essentially made in BC through the -- through the involvement of BC members, BC citizens, in the creation of the document, and further, by the ability of the province to customize and tailor it, if they so wish.

There was a bit of controversy over the adoption of the latest code, simply because of the unexpected closure of the branch and the confusion that that threw into the process. We were about to delve into the nuts and bolts of the code-change process when the staff disappeared. And so it took a -- it took a while to figure out how to deal with that. But ultimately the industry was satisfied that the national code was essentially okay, and that we could live without some of the previous changes we made to the code, that they weren't critical. They accepted the fact, I think, that the national process is a good one, and that, like I say, a lot of people from BC are involved in producing that document.

So to make the code in BC, I haven't seen anything, so far, in exactly what it is they want to make in BC. If we're relating strictly to leaky condos and the fact we have this unique climate in southwestern British Columbia, where it's very, very wet, the code recognizes the climatic differences across the country. There is a whole section of the code that provides climatic data for places all across the country, including Vancouver and Burnaby and Coquitlam and [indiscernible] and Victoria and so on. That climatic data includes the annual rainfall, the average winds, the seismic -- which isn't really climatic -- but the seismic activity, snow and so on. Clearly, you don't want to spend the money that would be required for a roof to support the snow in, let's say, Terrace if you're building that same building in Victoria. And the code has built-in factors to deal with that. The designer is -- applies the appropriate loads, including rain and wind, to the building to determine how it should be built. And that's the case all across the country. There are other parts of

Canada that have conditions similar to ours, certainly on the east coast, and there are specific numbers to apply to the design of a building. So from that standpoint, I don't know that we need any made-in-BC changes to that.

I'm going to skip over this one section on the structure of the code because I think the Commission is reasonably familiar with it, of the different parts and what they do. But I will refer to it a bit as I go on here further.

I wanted to touch on letters of assurance, although these particular words don't appear in the code, that's the term that's used to describe a series of schedules that are in the code that are required to be submitted to the municipality issuing the permit by the registered professionals: the architects and engineers involved in designing the project.

Now, this section of the -- of the code is unique to British Columbia, although, it's interesting that the province of Alberta has adopted it with their latest code, in '97, almost verbatim, from ours. And this was a result, primarily, of the recommendation of the McCloskey Commission on the Save-On Foods roof collapse, that there was a clear need, in the industry, for who is responsible for what, and in cooperation with the Architectural Institute and the professional engineers, the building officials and the BC municipalities, the Province assisted in formulating these letters of assurance and the appropriate language in the code to go with them. They basically state, starting at the first of these letters, that the owner has hired a coordinating registered professional, who is typically a project architect, that that coordinating registered professional is employed by the owner of the project to coordinate the activities of all of the other professionals that are involved, principally consulting engineers, but there may also be other architects and landscape architects and so on, involved in the building of this -- the size and complexities that these letters apply to.

Each of the individual consultants is required to submit a letter stating that he is -- or has designed the building in accordance with the requirements of the code, and will do field reviews throughout the construction to make sure that it is built in accordance with his design and the requirements of the

code.

At the end of the day, all those people, including the coordinator, submit a letter saying that they have done what they've agreed to do. Now, these letters don't impart any new responsibilities on the professionals over and above what they, as professionals, have always had to do. They simply put it in writing, on record, and indicate to all concerned, but specifically to the building official, who these people are and what their responsibilities are. So that, at the end of the day, if there's a problem in some are of the building, it's clear who had done the design work and who had done the field reviews for that portion of the design work, and therefore, you know, who made the mistake. These have been in place since 1992. City of Vancouver had a similar set of letters prior to that, and they have, with their most current building by-law, modified their letters to be essentially the same as the provincial ones. They were before, there were minor differences, but they picked up on the -- on the language here.

I think it's important to point out that this whole section of the code, section 2.6, was a cooperative effort between the professional associations and the building officials and the Province, and it took quite a while to put these together. Needless to say, their -- their legal counsel was involved in making sure that all the words were just right and didn't impart things that were unrealistic, and were reasonable to expect the professionals and so on to do.

So they've been well-accepted by the industry, from that standpoint. It took a little while for -- for them all to get used to them and understand exactly what they're all about, but I don't think there's any question, now, that they are accepted by the -- by the professionals, and that they do appreciate exactly what they're there to achieve.

Now, perhaps getting on to the nuts and bolts of this whole issue of the leaky condo. Where is the water coming from? I put this in because, with the second Commission, some of the things that the first Commission reviewed seemed to have been forgotten, at least in my mind, based on what I'm seeing being talked about in the media. And leaky condos, from all the information I'm privy to, at any rate, leak. It's

rainwater, getting in from the outside, pure and simple.

There was an extensive investigation done by a well-respected engineering firm, back in '96, under the sponsorship of Canadian Mortgage and Housing Corporation, and they were quite clear that there were a number of specific areas where these buildings were failing, and it was, by a large majority, the water getting into these buildings was coming from the outside, through some fairly typical failure modes, the intersection of walls and decks and roofs and balconies and so on, where there's improper drainage or inadequate waterproofing or poor flashing.

The other one that they did indicate was a bit of a surprise to them was windows were -- were leaking. And this is really the frame of the window is apparently allowing water into the cavity of the wall, as opposed to water leaking through the glazing and/or around the glazing into the inside of the dwelling. It's water that's leaking through the framework of the window into the -- into wall. And this was something that they hadn't expected. But nevertheless, this is rainwater getting into the building. Once it's in, it can't get out.

There's been allegations that the code is at fault because of the poly vapour barrier/air barrier issue, and that was specifically addressed in that study, that no, that wasn't the problem, neither was the entrapment of moisture in the wood in the walls during construction considered to be the issue.

Now, to perhaps put some -- some clarity on what the code does in fact require when it comes to keeping the elements out of the building and out of the wall. There's two sections to the code that deal with this: one is Part 5, the other is Part 9.

Part 5 is intended for -- and I'll use these words in a very simplistic term -- large buildings, which employ the services of professionals to design them. The -- Part 5 of the code has been around for many years, and has always been written in what's termed a "performance format." It informs the professional what level of performance he's expected to meet. He designs the building under his judgment as to how to best meet those requirements. It does not tell you specifically how to keep the rain out, it expects the professionals who are doing the design work to know. And it uses some very simple, and I think, very clear

language, and not to make too light of this, it's one of the few places in the code, perhaps it is crystal clear, in my mind.

Going back, at least as far as 1980, Part 5 had these words:

> The exterior wall cladding shall be so installed that it sheds water to prevent its entry into other components of the building assembly. Where there is likelihood of some penetration, drainage shall be provided to take the water to the outside.

Now, like I say, that's been around for a lot of years, and it's pretty simple language. In 1995, the *National Building Code* Part 5 was extensively rewritten, not to change any of the objectives, but the committee involved felt that it was -- it was time for an overhaul. It had been basically unchanged for quite a number of years. Technology has advanced, and they felt there was a need to -- to have a thorough review of Part 5 and a rewrite, and I think also in anticipation of a move towards a more performance-based code in general.

So the 1995 code, Part 5, as I say, came out in a -- in a more expanded format, reference to a large number of accepted standards for various kinds of exterior weather-proofing products and design guides and so on. The wording, however, is not radically changed. There's a bit more of it, and it now says things to the effect "except as permitted," and there's -- I won't get into some of these exceptions. They don't really have an impact on what we're discussing here:

> Where a building component or assembly is exposed to precipitation, it shall minimize ingress of precipitation into the component or assembly and prevent ingress or precipitation into interior space. Where protective materials apply to assemblies or installed to provide required protection from precipitation, the materials shall be installed to shed precipitation or otherwise minimize its entry into the assembly and prevent its

penetration through the assembly. Materials, components, assemblies, joints and materials, junctions between components, and junctions between assemblies exposed to precipitation shall be sealed to prevent ingress or precipitation or drain direct precipitation to the exterior.

An expansion, perhaps, of the old code. Like I say, I think this is what they were after, to make wording that was perhaps even clearer and more precise.

So this is the section of the code that is -- is intended, like I say, for the professional designer to use. He's reading this and says, "Okay. The code is intending me to keep the rain out of the wall as well as out of the building."

Part 9 of the code is -- some people use the term "a code within a code." It's expanded considerably in past years, from a very small, somewhat performance-based section of the code intended to apply to small buildings. I think the original intent was small buildings in more rural communities where the services of professionals were difficult to come by. So I say, this Part 9 goes back a number of years, but in the '70s, it was expanded considerably into a prescriptive set of requirements, once again aimed at non-professional, primarily builders, to build small residential and commercial buildings, principally wood-frame, and it was written with the idea that someone who had a reasonable knowledge of construction, i.e. a builder, could follow the requirements, the regulations in the code, and build a safe, healthy building to the acceptable minimum standards without needing a professional. And to that end, it is somewhat almost "how to," but not to the extent that it describes building construction practice. It simply details some of the minimum standards. Now, quite literally, it tells you how many nails to use and what length, in some areas, and it addresses what I refer to as generic building materials and how to use them.

Now, in the case of an exterior cladding, there is a whole section on cladding, which deals with generic, common exterior products, such as wood and vinyl siding, aluminium siding, Portland cement stucco, and

others, shingles and so on. And it goes into some detail about how to install those products. But once again, it's not a construction manual, in the sense that if you were to read this, you would know how to build a building. You're expected to know some of those basics before you pick up the code.

The introductory sentence in the section of Part 9 that deals with exterior cladding on walls says that:

> Exterior walls shall be protected with cladding, including flashing, trim, and other special-purpose accessory pieces required for the cladding system being used, to restrict the entry of rain and snow into the wall assembly.

Similar wording to Part 5, and requiring essentially the same thing.

I think, to me, both parts of the code are saying, keep the rain and snow out of the wall assembly. It's, to me, is that simple. And as I've said, I'll repeat: [reading] Part 5 expects professionals to design an appropriate wall assembly and specify appropriate materials for a given building in a given location.

Part 9 provides reasonably detailed instructions, suitable for knowledgeable builders for the installation of most generic cladding materials such as wood and vinyl side and Portland cement-based stucco.

Now, the -- the next area that seems to be causing a lot of confusion, and I can appreciate to people who aren't particularly interested in the science of building or the science that applies to -- to buildings, this is a bit smoke and mirrors, perhaps, but there's a requirement that's been in the code for a long time, going back to the '60s, actually, for something called a vapour barrier. This recognizes the fact that moisture is created inside buildings, simply through normal living. We exhale moisture when we breathe, we create moisture when we cook and shower and so on, we water our plants and so on. That water in the house, typically, is in the form of vapour, which we can't see, it's floating around in the air. A basic fact of science is that when that moisture contacts a relatively cold surface, it condenses out and becomes water, which we can see. And the most

obvious sign of that is water running on the windows. The windows are cold and the glass is at a fairly low temperature and the vapour in the air condenses into water.

The reason for a vapour barrier is very simple. Once we started insulating buildings, it became evident that this vapour was no longer condensing in visible things -- areas, like on the surface of the wall, where, because they weren't -- the walls weren't insulated, the surface of the wall could be cold enough that you'd actually get water condensing on the inside of the walls. But in fact, once you insulate -- the point where the wall assembly gets cold enough for the water to condense is somewhere hidden inside the wall, generally it's called "the dew point," and for the sake of argument, it's going to be roughly in the middle of the wall somewhere.

Now, when the water condenses in there, in the insulation, it is basically trapped by the fibrous insulation, and if it stays there long enough without drying out, mold and mildew will start, and the mold will attack the wood, and the wood will rot. So it was recognized, like I say, many, many years ago, that we had to deal with that problem, and the approach that was taken, for a long time, was simply to install a vapour barrier, a material that is impermeable to vapour, on the warm side of the insulation, and typically that is behind the interior -- the wall finish, the wall board or the plaster.

Many of us will remember fiberglass or Rockwell insulation with a coated paper on the back of it, which was the first kind of common insulation we used. That coated paper was the vapour barrier. The vapour -- the insulation was installed in the wall, usually stapled onto the studs, and the coated paper was -- was impervious to the -- to the transfer of water vapour.

In more recent times, and this is going back certainly into -- into the '70s, the late-'70s and into the '80s, the industry found a better way, more efficient, probably cheaper, and that was to dispense with the paper attached to the insulation, which was an expensive process, and replace the paper with polyethylene sheathing, which is stapled to the inside of the wall before the Gypsum wallboard is installed.

There is no requirement, in the building code, for polyethylene. It simply requires a material which has

a property of prohibiting the passage of water vapour through it, and it has to be installed in the warm side.

Further research, over the years, brought to light the fact that the real culprit in depositing water vapour, in the form of condensed water, in the wall was in fact leaking air, that warm air from inside the house will try and find its way outside, to the colder airs, another fact of science, and it does that through imperfections in the building envelope, cracks around doors and windows, cracks in the framing, simple things like the inevitable gap that exists between the floor plate and the floor assembly and so on. And as that warm air passes through the wall assembly, it will deposit moisture in the wall. Like I say, research began to reveal that that was a more serious problem than diffusion of the vapour through interior finishes.

So in response to that the codes were modified, and in BC, that came about in 1987. We had been using vapour barriers, the polyethylene, for many years before that, and in 1987, the code came out with a new requirement, which required the vapour barrier to be sealed one of two ways: either by overlapping the joints in the polyethylene at least 4 inches, or by caulking.

Now, that was -- I was involved in the building inspection side of things, at that time, and I distinctly recall the building officials in the community I worked, going through the new code and reading all these new requirements, and trying to figure out just exactly how that was practically going to be practised in the field, as were the builders. And a number of specialized products evolved out of that, to deal with this issue of creating a sealed vapour barrier, and a lot of caulking was being used to seal up the points where the vapour barriers had to be penetrated by electrical boxes and water pipes and so on. But it was -- you know, fairly quickly, the industry adapted to this requirement. And as usual, I'm sure there was a lot of grumbling from people about having to do it, but there's good solid research behind these requirements.

The code writers, the technical committees and so on, clearly got -- got wind of the difficulty involved in dealing with this, and it was also recognized that there's two separate issues here: there's the

diffusion of vapour, which, relative to the movement of air, is a minor problem, but still has to be addressed. Vapour will diffuse through Gypsum wallboard and so on, and eventually get its way into the -- into the wall. But there is the other issue of air movement, and they can be achieved with a single membrane, which is what the 1987 code is essentially saying, but there are other ways of doing it. The industry worked on that -- when I say "industry," I'm talking about designers and researchers and manufacturers -- and came up with other -- what they thought were better ways of dealing with these two separate mechanisms that were at work.

So for the 1990 *National Building Code*, which became the 1992 *BC Building Code*, they separated the two issues in the code, recognizing there is a need for a vapour barrier; there is also a need for an air barrier. Separated the two in the document, and provided two separate sets of requirements, once again without specifying any specific materials except by how those materials must perform. And recognize that you can choose whether to control air movement with the same membrane that you control vapour diffusion, or you can use a different membrane in a different location.

The movement of air is simply a matter of plugging the leaks, making sure that there are no gaps, no holes, no cracks in the exterior envelope that will allow the moist interior air to move out, except through a controlled mechanism, namely a ventilation system or by opening a window.

Industry came up with a way of dealing with that that has been fairly widely accepted by -- by the design and construction people, and it's generically termed as a "house wrap." It was decided that it was easier to wrap a air-impeding barrier around the outside of the house, where there are far-less little holes and things to deal with, than to do it on the inside, and so the house-wrap material, which breathes water vapour but stops the passage of solid air, if you like, through the wall, became a common choice, and the polyethylene went back to its old insulation mechanism of just simply installing on the inside, reasonably uniformly over the inside surface of the wall before they put the Gypsum wallboard on, but not worrying too much about making it absolutely perfect, knowing as well that it's going to get damaged

occasionally when the house is being finished, and that the air barrier, which is being installed on the outside by choice, is going to deal with the cracks and the holes and so on in the wall.

So once again, the code isn't mandating these items. One erroneous statement I heard was that the code requires poly on the inside and the outside of the wall, and that's the problem. Well, it clearly doesn't. It specifically prohibits that. It addresses the issue of the permeance of the vapour barrier, and the permeance of another membrane being used as an air barrier on the outside, or the cold side, of the wall, and requires that the outer one, if that's what you choose to use, has to allow the passage of water vapour through it, but has to stop the movement of air.

So we've seen a shift in the way things are done. Now, not all buildings chose this particular way. Some people still prefer to have both functions achieved by the single membrane on the inside, and continue to do that, but not necessarily.

The -- there hasn't been -- I've seen, anyway, from the people who say we shouldn't be doing this -- there hasn't been a suggestion what we should do instead.

The code in BC, starting in '92, does in fact require a certain minimum level of insulation. That is a unique requirement in British Columbia. The *National Building Code* has never had energy conservation as an objective. There is a -- perhaps an unfortunate coincidence that the vapour barrier requirements were being upgraded to a sealed vapour barrier in the mid-'80s. Some people seem to think that's in response to the energy crisis. In fact, no, it's simply a response to code objective of protecting the wall assemblies from deterioration, and providing a healthy environment inside the home, and a recognition that there was a more critical mechanism happening here, in the form of leaking air, that they had to address, and did so by bringing about the sealed air -- vapour barrier or air barrier requirement, and then followed that up with a choice of how you go about doing that in a later code. But that had nothing to do with -- with conserving energy. It's a side benefit, no question. If you stop warm air from leaking out of the house, you're going to burn less energy, but in fact the code uses a term --

it says you only require enough insulation to prevent condensation on the inside of the wall. It then requires the vapour and air barrier to keep the moisture in the inside of the building from migrating into the wall.

But until 1992, and actually it was a very, very minimal requirement in '92. The more -- the more stringent ones we have now came in in '94, as an amendment to the '92 code. Did we bring in minimum "R" values? They, clearly in BC, were there to -- to address energy. There was a significant push from the Ministry of Energy of the day and others in the -- that business to put some minimum "R" values into the building code to try and reduce the consumption of fossil fuels and electricity, and I don't think that's a bad idea. Whether the building code was the appropriate place to put it or not is a -- is a moot point, it was the most convenient place to put it.

So at that point, we mandated certain minimum levels of insulation in residential construction, but as you'll notice, '94 is long after vapour barriers had been in the code, and really the issue of insulation is not -- not the point. I don't think anybody, really, is going to say we should stop insulating buildings so we can stop putting vapour barriers in so we can let buildings leak and dry out by all this warm air passing through the wall. I think we're well beyond that, in this day and age, of simply wasting energy as a way of stopping buildings from rotting.

So air-tight construction is not required by the code to conserve energy. It's there to protect the building from deterioration that will happen, and -- if we don't do that. As I said before, polyethylene is not mandated, it happens to be the most effective product for dealing with vapour diffusion through the wall, and many people have chosen to use the house-wrap products as an air barrier, because of, once again, their -- their efficiency in use.

I have to, at this point, I guess, touch on the -- the letters from Mr. Currie, one of the past -- the original director of the Building Standards Branch, who were circulated in the media recently. His concern is valid. Back in 1987, he wrote a letter to the code people in Ottawa, voicing concerns, his concerns, about the potential to trap condensation within the walls because of the interior vapour

barrier, and principally, the use of vapour-impermeable panel sheathing, i.e. plywood, and waferboard or strandboard on outside. Plywood is impervious to vapour, not because of the wood, but because of the glue lines. So vapour won't pass through plywood or waferboard, and his concern was that the imperfect air barrier -- and we all accept it will be imperfect; we don't build perfect buildings (even the space shuttle wasn't perfect) -- that some of that moisture, once it gets into the wall cavity, would then not be able to get out because the panel sheathing on the outside wouldn't allow it.

The code is aware of that, addresses it, in performance terms and so on, by requiring there to be a gap in the panel, in the sheathing, if that's the kind of sheathing you choose to use (and most people do, these days, instead of shiplap). There has to be an adequate gap between the panels or holes or something in those exterior panel products to allow. for that very thing to happen.

So the code does address it, but certainly his -- his concerns were legitimate. It's been characterized as the government ignored him. I would say no, the government didn't ignore him, the government was cognizant of his concerns, addressed them, reviewed them. There was an attempt to -- to get response from industry, and from Mr. Currie specifically, as to examples of his concern that he knew about or anybody else in the industry knew about. There was none. We had a -- a deafening silence from -- from outside, saying that, yes, there was building rotting or problems because of air or vapour barriers.

The national technical committees reviewing these things, as well, like I say, certainly they were aware of what his concerns were, they agreed with him, and the national code was written to -- to address that particular issue.

My feeling is -- although I wasn't there, within the branch, at the time that these issues were being dealt with -- I feel that for a government to impose requirements in a building code based on unsubstantiated theory is not responsible. We have to respond to -- to the science and the -- and the research, and the building standards branch of the day was satisfied that that science and research was properly reflected in the national-model code.

So just to conclude, over the last few minutes, I

guess I've been seen as "defending the code," if you want to use that term, and fair enough. I've been around the building code for quite a number of years. I first got involved in this back in '73, in one way or the other, in different -- different jobs, I've been using the code ever since. I've been involved in the inspection and enforcement end for a number of years, and for about 10 years at the provincial level. And my concern was simply that with the erroneous statements that were floating about in the media, a number of affected condominium owners were going to see that, "Oh, good. The building code is the fault, therefore the government will pay our bills," and I really don't see that ever likely to happen.

The code isn't the fault, in my estimation. These buildings are leaking because they don't comply with the code, and I really don't think it's -- I think it's unfortunate that a large number of -- of unfortunate condo owners have been given the impression that their buildings leak because of inappropriate code, and therefore there's some -- there's some compensation coming.

I don't want to say that the code is perfect. No document of that size and complexity ever is, but it is constantly reviewed and updated. As you're probably aware, it's generally reprinted approximately every five years, and during every five-year cycle, the technical committees are meeting on a regular basis, both in person and, nowadays, virtually through e-mail and through other forms of correspondence, to respond to input from users, recommended changes, and some of those changes come out in between the five-year cycles, if they're considered to be important enough to deal with on an emergency basis, and the province is involved in that as well. So I think the code, although not perfect, is adequate in this area, and any tweaking that needs to be done is -- is relatively minor.

MR. BARRETT: Mr. Thompson, we'd like to ask a few questions [indiscernible].

QUESTIONS BY MS. ALLAN:

Q Mr. Thompson, if I could just begin with the purpose of the code being for safety and health, and that there's -- its basic objectives are set out for performance, and it's a minimum standard. Now, we

have heard testimony that suggests that in fact the code should be not a minimum standard, but should be prescriptive, that in fact the code should be prescriptive, and provide guidance as to how buildings, large buildings for residential purposes, should be built.

Can you comment on a code that becomes more prescriptive than performance, and what that would likely -- what impact that might have on the -- on the industry?

A Yes. Prescription is fine, to a point, and I would say, going back a couple of decades, at least, prescription may have been a very acceptable way to go, but as we approach the millennium, technology is moving very, very rapidly, and you could probably say something a little flippant, but that there's a new major product shows up, for the industry, every day. And if you write a prescriptive code, and Part 9 is the example of this, it is prescriptive, it gives specific details on specific kinds of products, but the products that it deals with are, what I would term, generic. They're common products manufactured by dozens, if not hundreds, of companies across -- across North America, in the form of traditional wood-siding, newer, but still traditional these days, aluminium and vinyl siding, and stucco and so on.

But prescription has extreme limits. Every time a new product comes out and it's not in the code, there is a major problem getting it approved for use on buildings. The way the system works, by and large, in most parts of the world, new and innovative products have to either be approved by the building official, which means they -- they, the municipality, impart significant liability on approving a new product for use on a building in their jurisdiction, or it goes through a higher level approval process at the province or perhaps national level. But until those products become common-place, it's very difficult to write prescriptions to cover everything. So that just deals with products, never mind design.

We've done things a certain way for -- for a number of years, and then somebody finds a different, or hopefully, better way of doing it. If that new and better way isn't described in detail in the code, it's problematic in using it. Once again because the building has to be approved by a building official, and someone has to spend time convincing the building

official that this new and improved method is in fact going to work.

So the code has, for many years, recognized that we can't have the code being updated, literally, every week to -- to address all kinds of new products and design solutions. And therefore, has tried to -- to be written in a format that allows for -- and certainly in buildings designed by professionals, who are supposed to have the knowledge and experience to make the kind of judgments that are necessary -- to allow them to decide how to make the building weather-proof as opposed to restricting them to doing it just this way.

Right now, everybody's saying, "Oh, rain-screen is the only answer. Well, I won't disagree; it's probably a very good answer, but it -- I will say right off, I don't think it's the only answer, and it may not be necessary on -- on some buildings. We have lots of non-rain-screen buildings that are dry. So to say that we should mandate rain-screen, I would certainly say yes, we can earn courage it.

If -- just to expand on that, I think the idea that code should be descriptive, as well as prescriptive, should tell you how to do things, to a point, yes, but I don't think that you can write a regulation that is a nice, friendly "How to Build a House for Dummies" type of book. It is a regulation, it has to be enforceable, it has to stand up in a court of law, ultimately, and the wording has to be fairly clear and precise, and that, by nature, tends to be not terribly friendly, sometimes.

But there is an extensive appendix in the back of the code for that purpose, where the code writers feel there's a need to explain what they're trying to say or to give examples, they can do that. The appendix is not a legally binding part of the code; it's there for explanatory purposes. And there are also other books available, produced by individuals, on how to build a house and how to comply with the code requirements and so on, and that's, to me, the appropriate place to -- to tell people how to go about doing things is an illustrated commentary. The National Research Council produces such a document, the New Home Warranty program in Ontario did, and the Canadian Home Builders have produced documents that are a combination of the legal requirements that you have to meet and explanation on how to do that.

Q So given that the building code is a minimum standard, then -- and you mentioned that builders need to have a reasonable knowledge of construction, which includes knowing how to use the code?

A Yes.

Q And that in addition, professionals are involved in the project after a certain size of project, by law?

A Right.

Q Now, I'm saying under Part 9, if it's larger than 600 square metres -- and correct me if I'm wrong here -- or three storeys, it's supposed have a qualified professional?

A Yes, out of the code, those are the -- those are the -- the breakoff point is over three storeys or over 600 square metres in footprint.

Q So in fact we're talking about, maybe, maximum, a 15-unit building. Anything larger than that would have to have a design professional, --

A Yeah, thereabouts.

Q -- under the code?

A Yeah, under the code, exactly, yes.

Q And it could be as small as a five-unit home?

A It could be, yeah.

Q And then in addition, the *Architects Act* says anything greater than five units has to have an architect involved in the project?

A That's right, yeah.

Q So what we're saying, with respect to the leaky-condo problem, is that any multifamily building greater than five -- greater than four units, five units and above -- at minimum, should have had a professional involved that would know how to use and employ the code properly?

A That's right.

Q And since your presentation suggests that the code -- standards in the code, if used appropriately, would have led to buildings that don't leak and rot, --

A Right.

Q -- we're really talking, then, about a failure of design and implementation of design, in what has caused these problem buildings?

A Yeah. I think we're -- we're dealing with an inadequate knowledge, on the part of a whole bunch of people in the industry, on -- on just what is required here. Not wanting to blame any group or -- or any sector of the industry, it certainly appears that the knowledge that is out there on how a building envelope

functions in the real world hasn't been transferred to the people who have to apply that knowledge, adequately. We've known about vapour transfer, and we've known about -- about these problems for a long time. It's not new knowledge, it's not rocket science. I can remember learning about this from -- from my first days with codes, and learning about it in school. So it's not that we've just learned that rain getting into buildings will cause them to rot, and that vapour getting into walls will do likewise, we know that. And we've been able, through the years, to build buildings that are reasonably weather-proof. But there's been a -- a number of factors that have come into play in the recent years, apparently, that -- that have caused this problem, and some of it, I think, seems to be a lack of -- of transferring this -- this knowledge to the people who need to use it.

Q Well, if the building science has been known, about what -- not only what causes the problem, but how to make sure it doesn't happen, do have you any comments to make about how we could better transfer that knowledge on a go-forward basis, since it seems to have been absent in the last 10 or 15 years?

A I think -- I come back to, you know, a word that seems to be the solution to a lot of ills is "education." From my exposure, over the years, to the various groups of people involved in the industry, it would appear that some of this basic knowledge doesn't get transferred at the inaugural education stage. I'm not speaking from personal experience, because I haven't gone through the schools of architecture, but certainly I have seen that architects going through a school of architecture, the ones that I'm familiar with, don't seem to learn technical stuff. Where they're expected to pick that up, I'm not entirely sure. But fair enough, if they're expected to pick it up during their articling, after they've graduated from the school of architecture, so be it. Apparently they've missed it somewhere. Now, how that should be tackled, I don't know. I suspect that the associations involved with the professionals should be, and they are now, providing that -- that knowledge.

I think builders, likewise, need to know why some of these things are being done. Yes, they're just following instructions, a set of plans and

specifications. In larger buildings, people out there, supposedly supervising the construction, telling them what to do, and really they're just doing what they're told. But I think it would be of great help if the people physically doing the work had a basic grounding in why it's being done. Because then, when things like building paper which is lapped backwards happens, the person actually putting it on would understand why it's important that it not be lapped that way, that it be lapped so it sheds water and doesn't trap water. Why is there a vapour barrier? What does it do? So that when the building inspector leaves the site, he doesn't slash it full of holes because he thinks he's putting people in a plastic bag, and they shouldn't have to live in a plastic bag.

So clearly, the knowledge hasn't been transferred properly, and the reasons that these things are in the code are not known to some people. There seems to be a general lack of professionalism, I guess, in the construction industry. And I don't think that's necessarily recent, but other -- other countries have a different culture around producing buildings, I think. Some of the products that are currently being used in North America, the EIFS, or the Exterior Insulation Finishing Systems, which have been part of the culprit in the leaky-condo issue, have been used for a number of years in Europe. They seem, as far as I'm aware, to be successful. But I think the culture over there is to spend more time and effort on making things right. And we seem to have put up a lot of buildings, here, in a big hurry, to fill a perceived demand, without really paying enough attention to what we're really doing, at all -- at all levels of that.

Q I'm sorry, I didn't catch this if you said at the beginning. Is your background in engineering?

A No, my background is building technology, and like I say, I've fallen into the code side of that whole thing for a lot of years.

Q With respect to the EIFS system, that is one method of face-seal, as I understand it, --

A Yes.

Q -- using that?

A Yeah.

Q Do you have any information regarding the life expectancy of the EIFS system?

A No, that's -- that's a tough question to answer.

There are no standards in codes, or a better word is there are no requirements in codes for minimum life expectancy. And most of the standards for products which are created by the industry that produces those products -- there's standards for asphalt roofing shingles, for example, there's standards for aluminium siding and vinyl siding and so on. These manufacturing standards are written to create a basic level playing field for the producers of these products, and to produce a basic acceptable quality product. And those standards are then referenced in the code, but by and large, those standards don't have a life expectancy minimum built into them.

Once again, it's difficult. We've never really established, I don't think, in our society, what's expected. There is, I think, on the part of the consumer, there's a fuzzy expectation that when you buy a house, whether it's new or used, yes, things will need to be maintained. You'll have to repaint once in awhile. You'll probably have to replace the roof sometime during your ownership. But we've established some -- some numbers sometimes. People used to think that a good cedar roof would last for 20 years; they don't anymore. I don't know whether they ever did last that long or not, but that -- those numbers got thrown around.

Another number that seems to get thrown around a lot, that there's an expected life span of a typical building of 50 years. That seems to be, quite often, related more to economics than how long the building will last. Certainly, we've got tens of thousands of buildings in North America that are much older than 50 years, and they're still performing fine and serving their function.

But codes don't establish a length of time any given product should last. The manufacturers produce a product, one of the reasons -- one of their sales pitches would be: It lasts -- clearly. If someone was to produce a cladding material for a building that was known to only last for a year, I don't think very many people would buy it. But they produce a product with a certain degree of durability, and I don't think a huge amount of thought is given to whether it will last 25 years or 50 years or a hundred years.

We have a general sense that certain kinds of products will last longer than others, because some of them are very, very impervious to degradation from --

from the climate, and others, we know will not last forever.

Q You mentioned that one of the main concerns that were raised by Mr. Currie's letters was the lack of space between the shiplap, and -- what's the technical term for the -- the space that he was trying to identify was necessary?

A Just a space.

Q Just a space. But that the code had provided for that?

A Yes.

Q Was that the 1985 code that became the 1987 BC code?

A I don't want to say that for sure; I'd have to look, but the recognition of that need for breathing to the outside is there, and he was writing in 1987, which is subsequent to the production of the '85 national code, and so certainly by -- at least by the '92 code, that was there. But as far as I can recall here, that was part of the code. I think his concern was that perhaps it wasn't adequate, it wasn't enough of a gap.

Q Well, could we potentially have a code that was enforced in British Columbia, without the necessary gap?

A No, I don't think we did.

Q Now, the need for the space was identified, it was incorporated into the code. Prior to that need being identified, was there anything, say, in the 1980, which became the '82 *BC Building Code*, was there anything in that code that hadn't been considered and/or addressed, that would have led to the problems that we're facing today?

A That's a question I really can't answer categorically. In hindsight, it wasn't a concern of the day. We didn't have leaky buildings, and certainly isn't an issue, at the time, that -- that I recall being -- being discussed, that, "Oh, we've got two vapour barriers here." So I would say that if the code did technically omit it, it wasn't something anybody had any concern of at the time.

Q Well, given -- I'm -- I'm a little concerned, from the point of view of built-in problems, and let me -- let me ask you a question this way. The distinction between the air barrier and the vapour barrier, which is an important distinction to understand the difference between the air flow and the diffusion.

A Right.

Q If you're building a small, single-family home, is the

need to understand that distinction less important than if you're building a larger residential building?

A From the -- no. From the standpoint of vapour transmission into the wall, I would say no. A large building is just a collection of -- or a large, multi-residential building is just a collection of dwellings, collection of single-family homes. They have -- each individual dwelling, in the case of a multifamily, has less exterior wall, in many cases only one, or two if it's on a corner. So there is that difference between a house and a -- and a condo, but from the stand -- the science involved here isn't going to change. The moisture is still being generated in the dwelling and is going to want to migrate out. So dealing with that issue is just as important in a single-family as it is in a multifamily.

Q I guess what I'm trying to understand is, if a builder uses the code to build a single-family home, and doesn't understand the building science --

A Um-hum.

Q -- in other words, follows the prescriptive Part 9 of the code, --

A Right.

Q -- and the lack of knowledge, is it less dangerous the smaller the building, in terms of, if you follow the rules and think you're going to face-seal a building and you can keep the water out, is that lack of understanding less dangerous in a smaller building than a larger building?

A Once again, no. I don't think, from the standpoint of protecting the vapour -- the exterior envelope from -- from vapour problems, no.

Q Oh, but vapour problems is from the internal moisture?

A Right.

Q But the wind-driven rain, which is the problem we have in this province --

A Right. If we're dealing with --

Q -- and that deals with the air barrier?

A If we're deal -- well --

Q Primarily.

A No, the vapour barrier is a two-way -- no question, it's a two-way issue. But it's principally the transfer of air, and in the case of stopping vapour from getting into the wall, it's from the inside out.

From the standpoint of protecting the building from deterioration from exterior sources, which is

wind-driven rain, you're quite correct, my sense is that the average single-family home is less at risk from that than larger, multifamily buildings, simply from the fact it's less exposed to the elements, in most cases, with or without overhangs and so on. It's lower to the ground, typically more protected by landscaping, by other buildings close by, and so on. So in a general sense, I would say that the single-family home is less-likely to suffer rain-leak problems than a much larger building with far more exposure to those elements.

Q So if you're a builder, building single-family homes that decides to move into multifamily, and you don't appreciate the need for understanding the -- the air-barrier role, and air flow, is it -- from your ex -- is it possible that you can build problems into the building and not know it?

A Oh, certainly. If you didn't know why you were doing things, and you were doing it without the guidance of the appropriate professionals, yes, you could build things into the building you weren't aware of. Just like -- like I said, we've heard stories, numerous times over the years, of builders admitting to slashing the vapour barrier after the building inspector had inspected it, and covering it up with a wallboard, because he didn't understand what it was there for. His concern was that people were going to be living in a plastic bag, and that, you know, that's unhealthy. So he was -- he was slashing the vapour barrier to eliminate the problem. That's not what it's there for. And so clearly that lack of knowledge could have a bearing.

Q And let's just look at the air flow, both internal and external. So let's say it is moisture from inside the building that's, through air flow, going into the walls and not able to get out.

A Okay, yeah.

Q If that -- and I appreciate the research says that's not our problem here. But let's say if it was, is it also true that the colder the climate, the greater the air flow from inside in...

A Yes, generally. We're talking about something they call "stack effect," which is warm air travelling to cold air, or rising, and you -- you're getting a pressure differential, if you like, because of temperature. So yes, in a colder climate, there's more -- more problem with that.

Q So would it also be fair to say, then, if it was air flow from in -- internal moisture causing the problem, which I also appreciate was one of the issues that Mr. Currie raised, --

A Right.

Q -- was that it was internal moisture, that if indeed it was internal moisture, because of the way buildings were being built, would we not expect to see that problem in other parts of Canada, because the climates are colder?

A Oh, certainly we would. Yes, we would expect to see it in other parts of BC.

Q And we don't?

A And to my -- we certainly are seeing building envelope failure problems in other parts of the world, as far away as New Zealand and, you know, the eastern -- eastern seaboard. But no, I'm not aware that we have chronic problems in Canada, specifically, or in BC, with interior moisture getting into walls in other climates other than ours.

Q And even -- even if it was interior moisture that was the problem, we would have less of a problem in the rainy climate because of the temperature differential?

A Yeah. We have less of a condensation problem here than you do in Prince George.

Q Can you comment a little bit on the dry rot versus the wet rot?

A In a simple word, no. I really don't know enough about that.

Q With respect to the process of code development, and I -- I'm sure you're aware that the Commission, in its first report, suggested the reinstatement of the Building Standards Branch, --

A Yes.

Q -- and I think it's certainly something we've heard consistently as being called for. That Branch was dismantled in 1997; was it not?

A Yes, January '97, yes.

Q What I'm trying to establish here is that -- is that, as important as the Branch may be seen to be, the problems we're facing today, in terms of repair needs, could not be considered to have occurred because of the dismantling of that branch; is that fair to say?

A Oh, no. I mean, we were well into the leaky-condo problem when the Branch was closed. No question, yeah.

Q So given that that Branch was responsible for the code

process, as I understand it, at least through the '80s and into the '90s, late 1990s, --

A Yes.

Q -- can you just comment a little bit more on the participatory process that was involved, and which parts of the industry were included in that, and the names of the committee, and how -- how the code would become adopted.

A Okay. What we established -- and this goes back, like I say, to 1985, was a system which wasn't being used anywhere in Canada. There was a -- there was a sense of frustration in BC, at that time, that the national code wasn't listening, that concerns raised over code issues in BC weren't -- weren't being adequately addressed by the national code system. I wasn't close enough to the system, at the time, to know whether that's really true or not. I think there may have been some personality issues between various players across the country, but nevertheless, that was what was seen, and the Building Standards Branch of the day decided that if Ottawa wouldn't open up the code development system to more -- to more user input, if you like, that we would do it ourselves.

So between '85 and ultimately '87, when the '85 national code, with changes, was adopted in BC, a fairly elaborate public process was put into place. Through advertising to -- "the public" I use sort of in the term of the general construction industry as opposed to the general public.

The building code is not a document that the average homeowner is going to be too interested in getting involved with. You know, most of them would never even see it, never mind, you know, get into a debate over it.

So the public, in general, would be the industry -- from the builder to the designer and everywhere in between, and it was advertised, through the industry, that we were soliciting, basically, proposals to modify the 1985 national code for use in British Columbia. And my recollection is that we received some 400-odd proposals from code users around the province, of suggested changes. Some of them were whacky, some of them were extremely good. The branch itself promulgated some changes that went into the code; they were produced in-house.

And once that whole process ran through, there was a -- there was a solicitation for code-change

proposals. We went -- we appointed a Code Review Committee, which was made up of a number of -- of knowledgeable individuals from the industry, a cross-section, once again, similar to the national --

Q Excuse me, can I just -- was it called the Code Review Committee?

A My recollection, yes, it was the Building Code Review Committee.

Q Okay. And the responsibility for that committee was the Building Standards Branch?

A Yes, we were basically shepherding the system through. So the committee -- the committee members were appointed, I think, probably by the Minister, as a duly appointed committee.

Q But that Code Review Committee had broad representation?

A Yes, oh, yeah. There was representatives there from the home-builders and the large-building construction associations and the architects and the engineers, the building officials, and so on.

Q To your knowledge, was UDI a part of that committee, as well?

A At that level -- at that time, I'm not sure whether UDI, as such, was -- was involved. I'm quite convinced the Canadian Home Builders were, or, you know, whatever equivalent association existed at that time.

Q HUDAC --

A Like I say, I wasn't as involved then in the actual code development; I was working elsewhere, but certainly was aware of the process, and part of it.

So there was a good cross-section of the -- of the construction industry in British Columbia sat on a committee and reviewed all of those proposals, made recommendations, which were then published for further comment from the general code user, and ultimately a set of recommendations were put before a -- what was called "a class of 41." Forty-one individuals from the industry were assembled, and appointed as a voting committee. They sat at a special all-day session of the Building Officials Annual Conference, in Kelowna, as I recall, and each one of the code-change proposals, the final version of it, that had gone through this review process, was put on the floor. People from the floor could come up and comment on it, and ultimately the Class of 41, based on the recommendations from the review committee and from the

debate on the floor voted yes or no, or -- I think there was three or four options, but essentially, yes or no to that proposal.

The Branch -- the ministry had basically agreed that whatever came out of that process would become the next edition of the code.

Q And which year was this?

A That was probably 1986 or 1987, early-'87 that the -- that final sort of vote, if you like, took place, and ultimately that was transferred into the document, which was published in late-1987.

Q So that code was adopted for the province of British Columbia?

A Right. Now, a similar process took place for the '92 code. The voting thing was set up, and didn't happen because no one showed up. We took that to mean that --

Q Sorry. Don't go so quickly over --

A The '92 code went through the same process. The 1990 *National Building Code* was produced, we basically said, "Okay. We're going to go through this BC review process once again." So it was repeated. The same general process, with a code committee appointed to review the recom -- the proposals that were submitted, published for comment, and so on, and this -- this meeting, if you like, for everybody to come and verbally debate the proposals for one last time, was scheduled and held, and virtually no one showed up.

Q Do you know why?

A We -- we took it -- and this was in -- you know, in discussion with various people after the fact, but it seemed that the industry in general was satisfied that the process, up to that point, was adequate, and that they didn't need to come and talk to it in person. There was one or two delegations on some touchy subjects that did come. But in general, the room was mostly empty. And that resulted in the 1992 *BC Building Code*.

Q So made in -- both those codes for the -- are made in BC?

A Yeah. They were both made in BC, from -- using a good, sound base of the *National Building Code*, and modified as the users in BC saw fit.

I think it's worth mentioning that, to the best of my knowledge, there were no recommendations or changes made to the building envelope issue.

Q There were none?

A There were none that I can recall.
Q In your position, when was the first time it was brought to your attention by industry representatives, in a -- a letter or a serious conversation, that the *BC Building Code* was at fault for the problems we're now facing?
A At this point, I can't say that the industry or any specific group has actually, in writing, said to Building Standards, or what is there now, Building Policy, that the code is at fault and this is how it needs to be changed. There has been discussion, some of it via the media. There has been discussion about the leaky-condo issue at various meetings that I've been at, but no one has actually sat down and recommended to the government that this needs to be changed. There's been a lot of talk, there's been a lot of throwing blame here and there, but I think, as evidenced by some of your previous submissions, when it gets right down to the crunch and you ask, "What is it that's wrong with the code?", there isn't an answer. There seems to be a begrudging acceptance that, "Well, okay, it isn't really the vapour barrier. We've seen the results of the research, and that's not why the buildings are leaking, but we still think the code doesn't address the unique climate." And we did certainly review the code after the first Commission reported out. No, not all of the recommendations were followed, but in -- from the technical side of it, from: Is the building code the reason these buildings leak?, there was pretty clear: No, it isn't. And both within the government and with, if you like, advisers from outside, the industry in general, there was no -- nothing that we could pinpoint that said if we changed this, this would help solve the problem.
Q The code process, I just want to ask you a couple of questions about the Building Safety Advisory Council.
A Yes.
Q What is that committee and its relationship to the code committee, code review committee?
A Building Safety Advisory Council, I've been involved with somewhat directly for the last two or three years. But prior to that, if I'm not mistaken, it was formed in the '80s as a industry representative council to -- to advise the ministry, or the minister, technically, on general construction industry-related problems or issues, and on a wide spectrum, it was not established as a technical code review committee, as

evidenced by most of the players over the years have been senior level executive officers and so on of the various construction-related associations that were -- that were appointed to that committee. Most of them, by their own admission, are not technically-oriented people; they're there looking at the big picture, like you say, construction-related.

Now, certainly some of the issues revolve around codes, but when it got down to the nuts and bolts, the technical stuff of the code, they would rely on the appropriate experts to deal with that. They were looking at, like I say, the bigger, more policy-level issues.

Q So given that the code review committee was the technical --

A Right.

Q -- side of the question, and the Building Safety Advisory Council would address the more practical sides of the issues, around construction issues, --

A Yes.

Q -- if you were to expect that there were serious problems with the code, one would expect to find it either coming out of the code review committee or the Building Safety Advisory Council?

A Yes. Certainly if -- if the Building Safety Advisory Council, or you know, some of their members became aware through their -- their association, let's say, that there was a serious problem with the building code, we would have expected it to come from them to us, that, you know, "It's our information that this is causing a problem." And they would bring it to the attention of the government whose regulation they're saying is at fault, and then, if necessary, you know, technical people would be brought in to deal with how do we fix the problem, if it is in fact the problem.

Q Now, I appreciate you've provided the Commission with a number of years of minutes from that committee, the safety advisory review committee, --

A Right.

Q -- and I was unable to find a reference that this was a concern, over any of the last five years. Are you aware of any concerns brought to you outside of the --

A No, I'm not. Like I say, I think the -- the concern with leaky condos, it was, you know, sort of --

Q I don't mean leaky condos, --

A Okay.

Q -- I mean that the code was somehow needing to be

adjusted to deal with our problem.
A No. I would say categorically that, over the number of years I've been involved with BSAC, and certainly with the branch over the 10 years, there hasn't been a proposal come to us that the code is inappropriate for our climate.
Q So is there -- is there any other places, in terms of code adoption process, the Commission should be exploring to find out what was identified when, as being the problem?
A Well, certainly because the code we use is produced through the -- the national code process, both Part 5 and Part 9, there are individuals within the province who sit on the Part 5 committee, and the -- what's generically been called the Part 9 committee, it's now called the standing committee on houses, but the -- there are certainly people within the province who have been on those committees over a number of years, and some of them who may be relatively new appointments, but people like that might be appropriate people to talk to, from their intimate knowledge of how that process works, and perhaps going back, you know, I don't know how many years you want to go back, but those committees do change, obviously, they renew their membership from term to term. But there are a number of people within BC who have been involved with those --
Q But new terms --
A -- that code development.
Q -- in terms of if the issue was raised in British Columbia, the committees we've talked about is where you would you expect to have them show up?
A Yes.
Q Yes. Thank you.
Now, are you at all familiar with R2000 construction as compared to other forms of construction?
A In a -- in a general sense. I'm not an expert, by any stretch of the imagination, on the details, but I'm certainly aware of it and read about it.
Q Well, what I'm curious -- a little curious about is, given this misconception, it seems, around the energy requirements, do you have any comment to make on the problems in R2000 homes as compared to other forms of residential construction? Are you in a position to comment on that?
A My knowledge of R2000, from what I read about it, is

that the people who live in R2000 homes are very satisfied with them. They find them very efficient to heat and maintain, and very comfortable to live in, and I'm not aware that R2000 homes have become a problem, in any way, as far as their -- their longevity or, you know, undue maintenance or leaks or anything like that. Anything I've read about it is that, although it hasn't been a wildly successful program, you know, we're not building gazillions of R2000 homes, that those that are built, the owners of them are very, very happy with them.

MS. ALLAN: Thank you very much.

MR. BARRETT: We're now going to take a short break, 10 minutes, and we'll come back with about another 20 minutes of questions.

MR. THOMPSON: Okay.

MR. BARRETT: Thanks very much.

(RECESS)

MR. BARRETT: Thank you, Mr. Thompson, and we'll reconvene. Mr. Leask?

QUESTIONS BY MR. LEASK:

Q You're the present acting head of the Building Policy Branch; correct?

A That's correct.

Q And I take it that while the Building Standards Branch was in existence, you were a member of that branch?

A Yes.

Q I think it might be helpful to the Commission, and even perhaps others listening, if you could describe for us briefly what the difference is today with the Building Policy Branch and the absence of the Building Standards Branch. What -- what has stayed the same and what has changed in that shift?

A Well, what certainly has changed is a significant lack of people, as you're aware. When the Branch was closed the -- it was made clear that it wasn't being downsized, it was being closed. Three of us and the secretary were retained as a policy office, and I was the senior -- we called ourselves cos-administrator [phonetic], and the director, who has since left the government.

We took some time to work out just what it was we were going to do with that reduced resource, and it

was clear from the start that we had to continue to administer the provincial building code at the provincial level, that's a large and important document, and that someone has to look after it. We also realized that it was going to be difficult to do the degree of code development work within the province that had been done in the past, and that we were going to be hard-pressed to provide the level of service to the industry as far as information and so on over the phone, through the mail -- now e-mail -- that we had been done in the past, that the number of different specialties, if you like, that existed within the Branch, different members who had different backgrounds and different knowledge bases, had been curtailed. So we were looking at, all right, we have to maintain the document, which is the building and plumbing code, and do the best we can to keep that document up-to-date, in concert with the work done by the national code, and deal with policy issues within the province around building regulation.

And to some degree, I can say that the Policy Branch does a work similar to the Standards Branch of the past, but to a much lower level, simply because we -- we don't have the people to -- to spread around, and we've recognized that, within BC, we will need to rely more heavily on the national process than we did in the past. Now, to that end, there's been an increase in involvement, by Policy Branch staff, on national committees. In some cases almost by default, because some of the policy level committees at the national code level are -- we are expected to participate in, but we've also made more of an effort to get involved in the technical and other levels of work at the national code, so that we, as a province, are directly involved in the -- in the development process of the code, rather than relying on individuals within the province to, sort of, carry that message.

That also means of course that we spend time out of the office, at meetings across the country, and I think the -- where the industry has noticed the biggest change is that there isn't a live body at the end of a phone like there used to be, to answer their immediate questions on the code. We do our best, we haven't, sort of, shut off the phone lines, although a number of people have said, "God, you're awful hard to find," but we are still there, but we simply have

not -- have been able to focus on what I would call "code development" within the province.

Fortunately, in the last couple of years, we haven't seen a specific need for any technical code-development work, but that's not to say we might not see it in the future. We still recognize, as does the national code system, that the provinces ultimately are the authority for regulating construction, not the Feds, and that every province has its own unique needs. And so although we're working very hard on a common national code, and it's -- by and large, that's what we have in Canada, each province does have its own unique needs, and may have to add or delete or modify that document to suit, and we still see that as a function. But like I say, in the last two or three years, we haven't seen a need for any specific technical development work. I think if we did, we would be having to relying on volunteer committees to help us with that, because we don't have the -- the depth of -- of knowledge within the Branch to get into some areas.

Q Is it fair to say that one of the functions that used to be performed, and there's simply no staff available to do any more, is code interpretation and assistance to building officials and industry people, on interpreting the existing code?

A I think that's fair. Any interpretation that comes out of my office now is seen as strictly the personal opinion of whoever you're -- the person is talking to, either me or my co-worker. In the past, yes, we provided -- we felt that there was enough expertise in the staff in the Branch to review a request for interpretation as a group, and come to a consensus, within the office, of what the province's interpretation of that was, because there was enough people there to -- to get a consensus. When you only have two and, you know, we could both agree and still be wrong. So we felt that, no, providing meaningful or quasi-official interpretations of the code is really no longer possible out of an office as small as ours.

Q Someone suggested to us, and I think it flows from what you've said, but let me just put it in the form of a question, that the City of Vancouver has a larger staff developing its building by-law than the province has working on the building code?

A I don't know that for sure, but I certainly have that

sense, that their -- their office is larger than ours, yes.

Q All right. Now, one code development issue on which we've heard some submissions is the idea that there should, in effect, be two codes. That there should be a separate housing code -- at least my understanding of that idea is that the current Part 9 would be separated out from the code and perhaps developed further or changed in some way, to make it a housing code -- first, are you familiar with that idea?

A Yes, I'm certainly familiar with the idea. It's been floating around at various levels for quite a while.

Q And it's been suggested to us that there's some work being done on that at the national level now; is that correct?

A Yes. There's a sub-committee of the standing committee on houses, which, in past years, was called the standing committee on Part 9. That is reviewing that, there's been a discussion paper produced, which I've had a look at, they were, you know, asking for comment back, and the idea -- it's been floated, there was a number of them, but I think the -- the basic idea was a proposal that Part 9 be replaced by a housing section, if you like, that would deal with one- and two-family, and row housing, basically stopping where you start to get one housing unit on top of another. So anything that we would call an apartment or a condominium would be in the body of the main code, but small houses and row housing would be in a separate document, and -- as I say, that idea has been -- has been tossed around, and there's been variations of it discussed, but I think that's the -- the basic principle they're looking at right now.

Q Do you have any comment on the wisdom of that idea?

A I think it's one way of dealing with an issue. I don't know that it's right or wrong. I think there is a recognized split, if you like, in the -- in the construction industry, where there seems to be a sector that produces primarily small, wood-frame residential construction. There's certainly a lot of builders out there who don't venture beyond one- and two-family. Even getting into row housing would be somewhat out of character for their business. There's other companies that are big enough to do virtually anything, from single-family to -- to multifamily. But there does seem to be that perception that there is the small builder who produces primarily small

homes -- or homes, and there is builders who have the wherewithal to produce larger structures, and that it might be more convenient, certainly for the small builder, who is primarily building single-family homes, if he had a book that just dealt with what he does.

An alternate to that is that the regulation remains as a single document, because it is after all, a regulation dealing with construction of all kinds of buildings, and that the builder of primarily one- and two-family dwellings be provided with a document, which is currently available, that lays out the legal requirements that he has to meet, as well as explanation and commentary and illustration of how to do that. It could be expanded into good practice as well, but -- and like I say, those books are available and have been for awhile. That may be a more appropriate way of dealing with it, I'm not sure. Certainly that -- that kind of a non-legal document provides an avenue for all kinds of illustration and commentary on how to go about doing t[illegible]s, and giving alternate approaches to meet code requirements, which a regulation, by nature, can't do. So that's -- that's another option.

Some people have talked about the idea of a residential code, which would incorporate all forms of residential construction, as opposed to just small residential, as a separate document. Once again, because there's perception, perhaps, that there's some different objectives behind residential construction as opposed to commercial, industrial, and institutional.

Residential construction is building a product for the consumer, and by and large today, the consumer doesn't actually go to build his home. Very few even hire a contractor to build one from a plan. They simply go and look for a dwelling, new or used. Certainly, the average consumer has no involvement whatsoever in the design and construction of the condominium. And they have an expectation that they're buying a durable, safe, healthy product.

Someone building a hotel or a shopping centre or an office building typically is in that business. They are developing or building for themselves, they are in a contractual arrangement with the -- with the builder, and at the end of the day, the two agree that, "Yes, this is what I wanted," level of quality

or not, aesthetics, the whole nine yards. So there's a direct involvement between the builder and the client. That doesn't exist, by and large today, with residential construction. So perhaps the objectives of the building code need to address that.

But to me, I don't care whether it's a single-family home or a 20-storey high-rise, if that's going to be done, that's -- that's a new -- a new direction, if you like, that the codes would have -- would have to look at. And that could still be done by simply adding an objective around, if you like, consumer protection, to the code as a whole, but perhaps restrict it to certain kinds of construction.

So I think there's a number of options, and I don't necessarily think that a house code would solve the problems. It might -- it's one of many options that might help the -- the construction industry.

Q Now, Mr. Currie was the director of the Building Standards Branch until his retirement; is that correct?

A That's right, yes.

Q When was that retirement?

A I recall he retired in '88, I believe, or thereabouts.

Q All right. To your knowledge, has he, since 1988, corresponded with the Branch, either when it was the Building Standards Branch or as it has become, the Building Policy Branch?

A Yes. There was a letter in -- I think it was '92, addressed to the minister of the day, I think reiterating his concerns that he voiced back in '87, just before he retired, to the *National Building Code* people, and up until that was announced in the media, I had forgotten about it because my level -- my position in the -- in the Branch, at that time, wasn't at a senior level, but certainly I've seen -- seen that letter in -- recently.

Q You've reviewed his 1992 letter recently?

A Yes.

Q Is there anything in that that causes you to have concerns today about the codes that are in effect today?

A No. It was the same issue that -- that he was concerned about in '87, and that being the -- the water vapour problem, condensation and trapping the moisture in the walls. Certainly in '92, the Branch did respond, and did do some research to determine: Is this a valid concern? Is there evidence that what

he's saying is in fact happening? I think I mentioned earlier, to Ms. Allan, that there was a silence from -- from outside. We didn't get a response, I know we didn't get a response from Mr. Currie, and we didn't get response from the industry that they were aware of any issue -- of any buildings out there that were in fact facing problems relating to condensation and vapour barriers and air barriers.

I can't say for sure that the Branch decided, "Okay. There isn't a problem, we're not going to deal with this anymore," as opposed to, "We're not getting a response, we have other issues to deal with. We'll carry on and" -- and it just disappeared. Because it didn't become an issue, there was -- there was no -- no indication that we needed to deal with it further.

Q All right. In your submission to us, you talked about house wraps and house wrapping?

A Right.

Q Am I right that a product commonly used for that purpose is called Tyvec?

A Yes. That's certainly one of the -- I don't know how many products there are, to be honest, but that's certainly one of them.

Q I'm not sure that anybody's, sort of, spelled out why exactly, but I believe there are people who believe that Tyvec may be part of the problem. Does that -- could you comment on that?

A Yeah. We're getting into an area where people have talked about inappropriate choice of materials and so on. I'm aware that, in remedial work on buildings, they're finding that Tyvec has become glued to the back or -- or become integral with the stucco. When they pull the stucco off to do the repairs, the Tyvec comes with it, and it's bonded to the stucco rather than simply tacked to the wall. Traditionally, we used the black building paper, and it's stapled or nailed to the wall, and then the stucco goes on on top. And Tyvec is installed much the same way. It's attached to the -- to the outside sheathing of the building, and then the exterior finish is applied over top of it. And they're finding that it's -- it's bonding to -- to the stucco, and as I understand it, from the -- from the experts in the industry, what happens is it bonds to the back of the stucco, and when water penetrates through the stucco -- and stucco is not water-proof, it will over time, absorb water, like any masonry type of product, concrete or bricks,

and if it stays wet long enough, the water works it's way through -- that when it gets right through to the back, the building paper is no longer a second layer of defence, because it's essentially part of the stucco, the water just goes right through, and then is in direct contact with the plywood or waferboard sheathing underneath. I can't explain any farther than that why this is happening, but that -- that -- I am aware that that is happening.

Q Obviously I don't have as much technical expertise as you. It would appear to be wise to construct the building and the wall system so that doesn't happen; right?

A Yes, very definitely.

Q All right. Now, Ms. Allan asked you a number of things about how the codes were modified for BC, starting with the 1985 *National Building Code*.

A Um-hum.

Q I just want to expand on that a tiny bit. When you tell us that, following the 1985 national code, the industry was circulated for suggestions, --

A Right.

Q -- how exactly did that process work? I mean, who did you send out the requests to?

A Well, I wasn't -- I wasn't an employee of the Branch at the time; --

Q Okay.

A -- I was actually working for the provincial government, but in another area, and certainly was involved in the process. To the best of my knowledge, the -- the information that we were doing that, or that the Branch was doing that, at the time, was circulated by a bulletin from the Branch. The mailing lists of those days was somewhat ad hoc, but certainly the principal associations, like the architects and the engineers and the builders and so on, would have -- would have been given the information, and it was hoped that they would pass it on to their members through their communication mediums. It was certainly distributed to building officials and, if you like, sort of, whoever else we could find addresses and so on that we felt would get it to the majority of the industry, and it seems to have -- it seemed to work. From my impression, my remembrance of the mid-'80s, there was a fair bit of participation from the industry in general in that process. I don't think there was a lack of -- of notification. A lot of that

stuff will certainly travel by word of mouth. Once a person gets the notification, it goes around and they phone up, and, "Can I get a copy?", and this kind of thing. So I think it did get to the majority of the industry.

Q In a general sort of way, I understand your answer to mean that you -- the -- not "you," but your predecessors, --

A Right.

Q -- circulated the main associations, assuming that members and industry people would learn about it from their associations; is that fair?

A Yeah. It's a process we still use, yes.

Q And that from the professional side, that would be the architects and the engineers; obviously?

A Right.

Q And from the builders, presumably the predecessor to the Canadian Home Builders Association?

A Yes.

Q If there was an equivalent of UDI, that body?

A Yeah.

Q As well of course as the groups that represent building officials and the main municipalities, I'm sure.

A Yes, yeah.

Q **[R]** All right. Now, it might be helpful to the Commission, and I'm going to ask you to see if this information's readily available. If it's not available, then, you know, don't, please, stretch your thin resources even further for us, but if you could find the composition of the 1985 code review committee, the composition of that "Class of 41." I mean, I assume somewhere in the file is probably a list that shows who those people were.

A Yeah. Those -- those files wouldn't be that hard to find. As a matter of fact, they may even be in the office now. We've been doing some -- some searches for various documents. But certainly that stuff was filed and should be available somewhere. It's getting old enough that it may in fact be legally disposable, but I think some of it -- most of that stuff we will be able to find.

MR. BARRETT: What age is that? [Laughter].

A No comment.

MR. LEASK:

Q **[R]** There's -- the Commissioner's worried about stale-dating, obviously, and that for the 1985 code

review committee, I take it there was a very parallel structure for the review of the 1990 committee, that became the '92 BC code; --

A Yes.

Q -- right?

A Yes. I was more involved in that one because I was working in the Branch at the time.

Q And the same sort of membership lists would be helpful to the Commission.

A Okay. We'll see what we can do about that.

Q And I wanted to just ask you a little bit more about what happened in the review of the 1995 national code. I mean, and I have understood your answer, that the abolition of the Building Standards Branch interrupted the process of code review; correct?

A That's right.

Q But just to get a little more specific, I assume the Branch didn't know it was going to be abolished much in advance of when it was abolished; is that true?

A No, we weren't.

Q So presumably, in 1996, a process somewhat similar to what had happened in 1985 and 1990 would have been going on, to review the 1995 national code?

A Yeah. That -- that had been the plan, and certainly it had been announced, in general to the industry, that we were going to do that. I re -- if recollection is correct, and a committee had been formed, I'm not sure that it was ever duly appointed and whether or not it ever had a meeting, but a committee had been chosen, --

Q Right.

A -- and like I say, they may have had a meeting, but with the closure of the Branch, that whole process was -- was radically reduced, and that committee, as such, never actually met to deal with the code.

Q And I think I understand this, but I want to say it in my words to be sure I do understand it. When the Branch was abolished and the much-reduced Building Policy Branch set up, one of the first concerns that your new smaller body had was, "What are we going to do about code revision?"; --

A Yes.

Q -- correct?

A Yes.

Q And if -- again, if I understand you, you did not feel that you had adequate personnel resources to conduct the kind of public consultation that had occurred

previously; correct?

A That's right, yes.

Q If you wouldn't mind expanding, just for a minute or two, about, well, okay then, what did actually happen?

A Okay. We -- needless to say, within -- within the Branch -- I mean, the Branch closure was announced in the fall of '96, and it was going to take a few months for the -- for the physical closure to take place. So knowing what was coming, the staff that was in the Branch started to work on, okay, what do we do to, if you like, close down?, what things can we -- can we finish off in the given weeks or months left?, and where are we going from here? And to their credit, the members of the Branch who knew they were going, still pitched in and helped in a certain amount of planning for the new policy branch that was going to take over. And part of that was, "What do we do with the code?" And so there was internal discussion, within the Branch, until such time as those people were laid off, did in fact leave.

We also discussed this with the Building Safety Advisory Council, as our industry advisors. You know, "Here is where we are, here is what we see as some of the problems, and what's your -- what's your advice on how to -- how to deal with it?"

I think, initially, there was of course significant displeasure, put it that way, in the industry, that we'd -- that the Branch had been closed. There was -- when that sort of thing happens, typically, there's a lot of -- you know, I'm using the words in quotation mark here -- "yelling and screaming and so on." But it became evident to -- to those of us who were going to stay, that we were going to have to be the lead here. The industry didn't seem to be coming up with any workable solutions that were likely to happen without us taking a lead, without the government sort of doing something, which is fair enough.

So we sat down and did some brainstorming and came up with a proposal, "All right, we need the new code. That's been made clear. Various groups in the industry have made it clear, we can't just sit around and leave the '92 code in place for the next who knows how many years. There is a new code out there from -- from the national code committees, and some of what's in it we -- we really feel we need."

The engineers, for instance, felt they were in an

ethical dilemma that there were new, more up-to-date standards for the structural designers in the '95 national code that they should be using. Ethically, they should be using the latest, up-to-date standards, and because that wasn't adopted as law in BC, they were having a problem with that. So they were one group that said, "We really need to get a new code in place."

And there were other issues in there. There was a lot of pressure to, at least partly because of the leaky-condo issue, to get Part 5 in place, because a lot of people felt it was an improvement over the old one, and we should be using the -- once again, the best standards available.

So it was pretty clear that the industry wanted a new code, a new updated code, and they weren't prepared to wait forever and just use the old one.

So we said, all right, given that, we made the proposal, after a great deal of soul searching and discussion, that we adopt the latest *National Building Code* with a limited set of revisions for BC, and we proposed, and had accepted by the Building Safety Advisory Council, a notion of only changing it where a unique condition or circumstance existed in BC that we felt we could only address through a change or addition to the code. Now, "unique" had a fairly lengthy definition, but it was conditions that don't exist elsewhere in the country, that do in BC, and therefore need to be addressed differently in the code, or the code doesn't address them. Quite honestly, political issues, government initiatives that can best be handled through a building regulation.

To that end, we reviewed the '92 code to see if there was any of the BC changes that were in there that fell into that criteria of addressing a unique issue. And there were a few. So we -- we proposed to bring those across to the new code and implement them. We dispensed with quite a large number of changes in the '92 code that were considered to be not addressing any unique concern in BC, they were just different from the national code, and in many cases, the national code had adopted some of those BC changes, and they were now in the latest edition of the national code.

We put that proposal to Building Safety Advisory Council, and I won't say it was accepted easily, but

ultimately, they agreed, yes, that's a reasonable way to go, and go for it. Their may concern was, adopt the '95 national code, and I think words were used "with as few changes as possible."

It was agreed that the Building Safety Advisory Council was not the appropriate body to do a technical review of what we were proposing, and so it was proposed that a sub-committee of BSAC be put together for the plumbing -- for the building and the plumbing code, and that those two groups look at our proposals, from the -- from the Building Policy Branch, at a technical level, make recommendation to the ministry as to whether they were good or bad or not. And we went through that process, there was two or three meetings of those respective committees to look at the two parts of the code, building and plumbing, and at the end of the day, we seemed to get a reasonable consensus of what we were doing was okay, and produced the code.

The code was in fact in production, or very close to it, when your Commission met the first time. And it was decided that we would wait, at least until the Commission reported out, before producing the code. We were only concerned with the possible recommendations around building envelope, and that was reviewed when the recommendations came down, and there were -- was another ad hoc committee formed to look at Part 5 specifically, based on one of your recommendations. That group comprised industry experts, because we didn't feel it was appropriate to wait much longer, and they agreed that, "No, we're quite happy with Part 5, it's well-written." There was a couple of very minor editorial changes made to it, which were also agreed to by the National Research Council staff that was part of that committee, that, "Yes, okay. That could be worded a little better," but we weren't dealing with changing requirements, simply making it slightly clearer. And that was the process we went through.

Once that final review, if you like, of Part 5 was done, then we went to the presses and produced the code, and it became effective in December.

Q **[R]** Again, it would assist the Commission to have a composition of the sub-committee of the Safety Council that looked at the building code, we don't care about the plumbing code particularly, interesting as it is, and -- and that ad hoc committee that assisted you

with Part 5, the composition of that would also be helpful.

Now, we've been told, in submissions here, that the HPO advisory committee has, I think, formed a sub-committee or a group of its members who are about to look at building code issues from their perspective.

A That's right, yes.

Q You're aware of that, I take it?

A I'm on it.

Q Oh, okay. That was my essential question. [Laughter]

A We've had one meeting to sort of establish terms of reference, and there's another meeting scheduled.

Q I don't want to hold you responsible for this, because it's obviously not your committee, but do have you a sense of when that group is going to be able to complete its work?

A From the first meeting, I had a sense that they wanted to go through this fairly quickly, so I think, you know, early next year was -- no specific dates -- but early next year was mentioned, as reporting out, yes.

Q We have other means of doing this, but just to let you know that obviously the Commission was very interested in the work of that sub-committee, and looks forward to seeing that report, if possible, before we report out.

A Okay.

Q It's hard to know how that timing is going to work, --

A Exactly.

Q -- but if it does work, we'd like to see that.

Now, I think I want to conclude with a question that I think you have already answered, but I'm going to put it in my words to see -- make sure I've understood it, and so tell me if I'm right. Leaky or rotting condominiums that are -- become that way through water incursion into the building envelope aren't caused by conforming to the code, they're caused by violating the code?

A Yes.

MR. LEASK: Thank you.

MR. BARRETT: Ms. Allan has one more question.

FURTHER QUESTIONS BY MS. ALLAN:

Q Sorry, Mr. Thompson, my curiosity has been raised here by a couple of things that you have said in the last few minutes. But I'll start with -- going back to the

your statement earlier of saying that Mr. Currie identified the need for an air space in the '85 code, and that that was addressed as the air barrier and vapour barrier were being separated, in terms of the understanding or approach to them?

A Actually in '87, when he wrote his letter to the national code people, we were dealing, at that point -- we had already adopted the 1985 code, if I have my times right here, which -- that's the point where we went from just a vapour barrier to a sealed vapour barrier. I think his concerns there were, "We now have this sealed vapour barrier on the inside, which we know won't be perfect," and I'm sure he was also aware that this was trying to address the air movement issue. And we have a -- potentially another vapour barrier, not an air barrier, but another vapour barrier on the outside, and he was concerned that we were ratcheting up, if you like, to a point where we might have problems with the inside of that wall.

Q But that the -- the solution was to create enough of an air space?

A The solution was to make sure that the -- the exterior membrane, or membranes, depending on how the building was built, would allow moisture to evaporate to the outside.

Q Which the *BC Building Code* had adopted --

A Yes.

Q -- that approach?

A Yes.

Q So would it be fair to say that the letter, in 1987, wasn't about BC at all, it was -- it was a letter to the National Research Council saying, "We've got it right, and the rest of the country might be getting it wrong"?

A I think, yeah, it's fair to say that, at this -- at that point, we weren't -- we weren't addressing a unique BC concern. We were addressing a general building science issue that we might be trapping moisture inside the wall from interior sources.

Q Which BC was avoiding because of this process of 41 participants from the industry --

A Well, certainly.

Q -- adopting a code that had addressed "if you're going to tighten it up, you also do this adjustment"?

A Yes.

Q So you also mentioned, in 1988, Mr. Currie retired.

A Right.

Q That means that when the 1987 building code was adopted, he was head of the Building Standards Branch?
A Right.
Q So the Building Standards Branch was responsible for this process of code adoption?
A Yes.
Q So had there been any other concerns that Mr. Currie had -- would it be reasonable to assume that he was in charge of the organization that was responsible for the process of adopting changes to the code?
A Yeah.
Q So any of his other concerns may have made their way into --
A Oh, and as a matter of fact, did. Like I said, there was some code changes that were promulgated within the Branch of that day. One of them, in particular, was the design of stairs. And my understanding was that was one of Mr. Currie's particular interests, and the Branch worked on a -- on a package of -- of revisions for stair requirements, which did ultimately go into that code.
Q So the -- is it also fair to say, then, because there were numerous issues raised in Mr. Currie's subsequent letters, in '91 and '98, I think it was, --
A Um-hum.
Q -- to the ministry, is it reasonable to conclude that all of the other issues, which I know you've addressed some of them, had either been dealt with in the 1985, '97 [sic] review, and had been considered not to be important to draft in the code, that in other words, any -- any and all issues would have been addressed in that participatory process?
A I think, in one form or another, certainly -- in the '87 *BC Building Code*, a whole number of provincial concerns had been addressed and dealt with in a very open and democratic manner, and the same process existed for the '90- -- '92 code, and probably the letter that he wrote in '92 was -- was undoubtedly brought about because he saw the new code, which he wasn't involved with, and still had a concern.
Q He was -- in fact was the senior bureaucrat --
A Well, in '92 he was retired.
Q No, I'm sorry -- oh, the '92 code, I'm sorry.
A Yeah. So when the '92 code came out, there was another letter, --
Q The national code, though.
A -- I believe, -- yeah, well, the national code, and

then subsequently the BC code. And his letter to the minister of the day -- I believe it was in '92 -- I'm pretty sure it was because he now had a copy of the newest BC code, and he felt -- he felt it still didn't adequately address his concern. I guess our feeling was that the code did adequately address it, because it had gone through the appropriate technical review and so on that the people at the national code level -- this was -- this was a known issue and being addressed, and adequately, by the -- by the appropriate committees, --

Q So?

A -- and it didn't come up within the province as an issue.

Q So the issues in the '92 and the subsequent letters, was there anything in those letters that were new information to you or your -- or the process?

A No. It was a repeat of his concerns from before he retired.

Q That had been addressed?

A Yes.

Q And I guess one final question I have is, the need for adequate air space, how long is the understanding of that building science phenomena, I guess, been known? Is that -- does that date back to the '50s and '60s, when the research was done for the building digest?

A My sense is that the -- the idea of applying rain-screens or drainage channels or air spaces between the cladding and the structure of the building, the sheathing, is something that hasn't been appreciated until fairly recently. It's not a new idea.

Q By who -- I'm sorry, appreciated by who?

A By the industry in general, and perhaps even the -- the code writers. It's not a new concept. I'm sure it's been brought to your attention before, that large buildings, office buildings and so on, with curtain walls are a rain-screen principle. They've been addressing known problems with large buildings with significant exposure to wind, and uneven exposure to wind across their faces, and they've addressed that in various ways. One of them is the curtain wall, which is a very common form of construction in large office buildings and other buildings of that type, but it's not used universally.

Masonry veneer, used in all kinds of construction, has traditionally had an air space behind it, knowing

that masonry is not waterproof, that water will work its way through cracks or just through the brick and the mortar, and it needs to have a way of getting out. And there's weep-holes at the bottom, and the -- moderately -- the water will run down the backside of the brick.

So there is an understanding of, in certain situations, a need to separate the cladding from -- from the sheathing beneath it.

But it would appear, certainly, that the situation we're running into here, I don't know that that was fully appreciated by all concerned, that that was perhaps required.

Q Um-hum.

A Now, having said that, we have lots of buildings out here, with relatively traditional construction, of no air space behind them, that aren't leaking. And so this is why I say there's a number of factors, and that may be where the lack of adequate knowledge is in when do we -- when should we be applying rain-screens or air channels, and when is it not necessary? And that's another reason that I don't think it's appropriate to mandate a specific approach, because it may be overkill, in many cases.

Q But I mean, isn't that consistent with Part 5, which I understand has probably been in the code since the early '40s?

A Well, Part 5 --

Q Part 5 says if the water gets in, it has to get out, and it doesn't matter if it gets out quickly through a screen or it's able to breathe out, --

A Yeah.

Q -- it has to get out.

A It's certainly a recognition -- it's certainly a recognition that we don't want water staying in the wall, and we don't want water trapped behind the cladding. I mean, that's going to be a problem.

MS. ALLAN: Thank you very much --

Q [R] Oh, one final request. Part 5 and Part 9 National Research Council committees, --

A Yes?

Q -- could we please get the name of the chair and how to contact them, --

A Sure.

Q -- would that be possible to come to me?

A Sure.

Q Thank you very much.

MR. BARRETT: Mr. Thompson, I want to thank you, first of all, by way of an apology. We asked you to come over, and our agenda was changed, and you graciously accepted a new date. I want to thank you for that. And I want to thank you for your patience today, and your presentation, and we anticipate, if you have the chance to mail into the Commission, the material that both Mr. Leask and Ms. Allan have asked.

MR. THOMPSON: Yes.

MR. BARRETT: And that concludes our... Oh, I've just been told that I have to announce that our next session is Tuesday, November the 20th [sic] at 9:30, here, same location, next Tuesday, 9:30 in the morning, and there's a change, on Wednesday, from 2:00 p.m. to 4:00 p.m., rather than the morning, here in the same location.

Thank you again.

MR. THOMPSON: Thank you.

MR. BARRETT: And I would add that my -- or the house we lived in was built in 1909 and leaks both ways, air and all.

(ADJOURNED)

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IN WITNESS WHEREOF, I have hereunto subscribed my name and seal this **28th** day of **November 1999**.

C Kottmeier

Catherine R. Kottmeier, OR, RCR
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RES

MR. BARRETT: Adaire Chown?

PRESENTATION BY MS. ADAIRE CHOWN:

Thank you.

MR. BARRETT: Adaire Chown, the senior technical adviser of the Canadian Code Centre, the Institute for Research and Construction, National Research Council in Canada, and I want to thank you for coming for this presentation.

MS. CHOWN: You're very welcome.

As you say, I'm senior technical adviser at the Canadian Code Centre. I provide technical advisory support to the standing committee on environmental separation, which is the committee responsible for part 5 of the *National Building Code*, and I also serve as technical adviser to the standing committee on houses, which is the committee responsible for part 9 of the *National Building Code*.

This presentation is in response to your request provided to the council last week to provide some information on the *National Building Code* and also on NRC's response to correspondence from Mr. Jim Currie.

You'll appreciate that I've had limited to time to put together this material, so I'll essentially follow the written submission.

National Building Code of Canada is a model code. Its principal objective is to provide requirements and criteria to provide minimum acceptable level of health and safety for occupants of buildings across Canada. The NBC is a model code, it has no legal status unless it is adopted or adapted by an authority having jurisdiction.

Through adoption and adaptation, however, it serves as the basis for all regulation of buildings in the country. The primary health issues that are addressed in the NBC include sanitation, indoor air quality, indoor temperature and moisture conditions, protection from noise and vibration. The safety issues addressed include structural safety, fire safety, safety in use such as provided by guards and handrails, and to a limited extent, safety during construction and demolition. The NBC also provides requirements that address some other issues such as accessibility and protection of buildings in fire.

The NBC does not address energy efficiency. It's the *Model National Energy Code for Buildings* and the

Model National Energy Code for Houses that address this issue, and like the NBC, these codes are model codes. They have no legal status until adopted or adapted by an authority having jurisdiction.

The provision of requirements in the identified subject areas doesn't mean that the NBC addresses in complete depth or breadth all of these subjects. For example, the NBC addresses sound control, but only with respect to airborne noise, not with respect to impact noise.

The NBC, as I mentioned, addresses health, but it does not address all aspects of health. For example, it doesn't address conditions that would be appropriate for people suffering from hypersensitivity to chemicals. Nor do the requirements aim to eliminate all degrees of hazard. The code, as I mentioned, includes requirements for guards and handrails, but it does not require that guards be installed if the difference in elevation is less than 600 millimetres, that's the level of hazard is considered to be acceptable. The code addresses fire safety, and yet we allow and permit the construction of combustible buildings with appropriate protection.

So the requirements are intended to specify minimum level of protection needed to provide an acceptable level of health and safety.

Now, the criteria specified in the building code may be based on either empirical evidence or science or a combination of the two. Code recognizes that the best laboratory in the world is out there beyond our walls, and that science cannot necessarily explain all the mechanisms that are involved in any particular situation.

Consequently, the code provisions often describe what has been demonstrated to provide effective performance over time, whether or not we completely understand why that is the case.

As we learn more about building performance, requirements to the code are updated to reflect that understanding, but we have to take great care to ensure that performance is verifiable. We cannot simply rely on computer models or tests, we have to ensure that what is demonstrated by those models and tests is in fact reflected in the field.

The code as a whole is written by code users: developers, designers, builders, manufacturers, regulatory officials, owners, managers, you, and I.

It's the community at large that decides what the code addresses and what levels of performance should be specified in the requirements. Changes to the code may be specified -- may be proposed by anybody who is interested in doing so, and changes are made with due consideration of the existing provisions, the reasons for the proposed change, and the supporting evidence to ensure that solutions will be appropriate and effective.

Proposals are subject to review by one of several standing committees. These committees have representation from all regions of the country and all relevant interests. Participation in the standing committees is not limited by geography or by financial situation.

British Columbia has provided significant input to the development of the *National Building Code*, and if we look, for example, at the standing committee on housing and small buildings, currently known as the standing committee on houses, and looking at the period leading up to the publication of the 1980 NBC up to the present, the average representation on that committee from British Columbia was 18 per cent.

Proposals are also submitted to general public review. And this provides an opportunity for all interested parties to participate in the code development process, to critique proposals, propose revisions, or to indicate support. In the development of the 1995 NBC, over a thousand changes were proposed, over 4,000 comments were considered by the standing committees before any decisions were made.

Within the resources available, the staff of the Canadian Code Centre and research advisers from the Institute for Research and Construction provide technical information to the standing committees to assist them in their deliberations. Information isn't drawn just from the Institute, it's drawn from across Canada and around the world.

In addition to the technical requirements that address the subjects I've mentioned previously, the *National Building Code* provides general statements of application, definitions of words and phrases that have special meaning within the context of the code, references and information on climate information, and requirements related to design information and design review that is -- that must be provided to indicate compliance with the technical requirements.

Now, in its provision of technical requirements, the NBC contains both prescriptive and performance provisions. Even part 9, which is generally considered to be a prescriptive part of the code, includes performance requirements.

In many of the discussions related to the condominium failures, numerous comments on the code have focused on the prescriptive requirements, but in evaluating the adequacy of the code in addressing a particular concern, or in evaluating the compliance of a construction with the code, the focus should first be on the performance requirements.

Just to lend a little bit of complication to the discussion, when we look at larger buildings, the current requirements for building envelopes are provided in part 5 of the *National Building Code*. Up until 1980, they were included in part 4. So if we look back at what the code has provided on a performance basis for larger buildings, we find the provisions in section 4.7 on cladding. And the provisions have essentially remained unchanged since 1965, up until the 1990 NBC, and I'm sure you're -- you're very familiar with the requirement. I'm sure it's been oft-quoted to the Commission, provision that was in the -- in part 5 in 1990, that referred to the requirement for all exterior cladding to shed water to prevent entry into other components of the building assembly, and when there is a likelihood of some penetration, that drainage must be provided to take the water back to the outside.

Of note here in this wording is the emphasis on protection from ingress, with drainage only as a second line of defence. To recognize an absolute prevention of ingress is difficult, given construction tolerances and the performance of building assemblies over time.

If we look at the construction of smaller buildings, we can look as far back as 1950 to find performance requirements. The code for dwelling construction for buildings housing one or two families was published in 1950 and had a performance requirement that required that the exterior wall covering be applied in such a way that the sheathing and framing beneath is effectively protected from the weather. Now, although the application of that code is such that it wouldn't have applied to the BC condominium projects, is indicative of long-term

understanding of the function of the cladding.

And again, the more familiar requirement today is the one that is presented in article 9-27-2-1 in part 9, which requires that the cladding restrict the entry of rain and snow into the wall assembly. And this provision has effectively remained unchanged since 1975.

Again, the focus here is on control of rain penetration at the cladding plane, and secondarily, the provision of flashings and sheathing membranes to redirect incidental moisture ingress.

Now, it's these performance requirements that state what must be achieved. They must be complied with, regardless of what other provisions apply in the code. Knowledge of acceptable construction is critical to compliance. The code doesn't tell designers or builders or manufacturers or regulators everything they need to know in order to achieve this end. The code acknowledges and relies upon the massive amount of information that's available on design and construction, and recognizes demonstrated acceptable performance. It does not attempt to serve as a design guide or to describe acceptable construction details.

The prescriptive requirements, most of which are found in part 9, state, for some specific materials and components, the properties and installations that are consistent with achieving the performance requirements. They're not intended to be complete or comprehensive.

For simplicity, a set of prescriptive requirements may define a solution that exceeds the required minimum performance in some cases.

To give a very, very simple example. Part 9 requires that foundation drainage be provided by tile or pipe that is not less than a hundred millimetres in diameter. In certain circumstances, you wouldn't need a 4-inch pipe to provide the drainage that's needed, but for simplicity's sake, the code specifies a hundred millimetres.

There's considerable redundancy in the requirements in section 9-23 on wood-frame construction. And again, this is simply for the sake of simplicity, so that one is not required to do an engineering analysis of every house.

Conversely, in reflecting adequate and acceptable construction, the prescriptive requirements do not

necessarily reflect best practice. The intent here is to define minimum acceptable practice for health and safety. Consequently, the prescriptive requirements may not be consistent with optimum solutions that are recommended in the literature. And again, the code recognizes the vast amount of information that's available on building design and construction and on -- that has demonstrated acceptable performance.

The intent here isn't to be argumentative but just to provide one example. I've included in my paper a quote from a publication written by a preeminent American architect, Andrew J. Downing. Publication was published in 1851, and he's discussing stucco installations and says that:

> Nothing but attention to a few simple rules is necessary to ensure success in stuccoing in this country.

And he proceeds to provide a set of rules, the first of which is not to use stucco except on buildings with projecting roofs, in order to prevent the possibility of the wall getting saturated at the eaves. Now, this is not to say that one should not ever build buildings with stucco that do not have overhangs. What it says is that if you diverge from traditional practice, you have to re-evaluate the design and construction of your building to address the changes in moisture loads on that building envelope.

MR. BARRETT: Where is he now when we needed him?

FROM THE FLOOR: [Laughter]

MS. CHOWN: To that end, the code specifically states that it is not intended to limit the design or construction of buildings, provided that the end result produces construction that will perform at least as well as a building that is built to the specific requirements of the code.

I'd like to move on now to address the correspondence received from Mr. Currie. In addition to specific proposals for changes to the code, the standing committees also respond to general correspondence, and the National Research Council received correspondence directly from Mr. Currie in 1987, and then, in 1992, received correspondence from Mr. Jim Trainor -- actually, it was a letter that was copied to the council. The letter was addressed to

Mr. Jack Robertson, who was then director of the BC Building Standards Branch, referring to correspondence with Mr. Robertson, with Mr. Robin Blencoe, then Minister of Municipal Affairs, Recreation, and Culture, and also included a letter of December 1991 from Mr. Currie.

In the 1987 correspondence, Mr. Currie raised five points. First was his concern over the perceived effects on air moisture tightness of the -- what he considered to be the energy conservation requirements in the *National Building Code* and the consequent jeopardizing of health and structural sufficiency. Second was his perception that new low air and vapour permeance sheathing materials were being accepted without consideration of the overall required performance of the assembly. Third was a lack of definition of the air barrier system in terms of vapour perform- -- vapour permeance. Fourth, lack of compliance with the requirement in the code for maximum 19-per-cent moisture content in lumber, and finally, inadequate ventilation as a consequence of sealing the building envelope. I've provided in my paper some comments on each of these, and I will go through these quickly.

I've noted previously that the *National Building Code* does not address energy conservation. This is the purview of the model national energy codes. The air barrier system and vapour barrier requirements in the *National Building Code* are provided to reduce probability of excessive condensation of moisture within the building envelope as a result of outward migration of water vapour from the interior. "Vapour barrier" addresses vapour diffusion. "Air barrier system" addresses vapour transfer due to air leakage.

Requirements for vapour barriers have been included in the code since its first edition in 1941. The evolution of the code to also identify explicit requirements for air barrier systems is not in response to energy concerns, but rather in recognition of building envelope failures. And these requirements reflect a better understanding by researchers and practitioners that air leakage is the more significant moisture transfer mechanism, and the first requirements that explicitly referred to air barrier systems were provided in the 1965 *National Building Code*, long before the energy crisis of the '70s.

With respect to moisture entrapment, Mr. Currie

correctly identifies potential for moisture accumulation where there are low vapour permeance materials on the interior and exterior of wall assemblies. However, the demonstrated effective performance of wood-frame wall assemblies that comply with all the requirements of the code does not support Mr. Currie's concerns. And it is notable that just as the 1941 *National Building Code* calls for vapour barriers, it's also notable that it recognizes the use of plywood. This was not a new material in the late-'70s or early-'80s.

With respect to permeance of materials in the air barrier system, the building code permits significant flexibility in the design of building envelope assemblies, and the location of the air-tight element of the air barrier system is not significant unless it is a low vapour permeance material. The code provides -- and has never provided any requirements that would preclude low-permeance materials from being installed on the interior of the assembly, but for clarification, the issue is addressed explicitly in the 1990 *National Building Code*, and additional explanatory information was included in the appendix to that code.

Moisture content of lumber. It's noted that if climatic and industry conditions are such that it is considered necessary to finish wood-frame walls before the moisture content of the lumber can be reduced to 19 per cent, then the code requires that an alternative construction be used.

The ventilation issues raised by Mr. Currie do not pertain directly to the deterioration issue, so I haven't addressed them in the paper, but if the Commissioner has any questions on the subject, I'd be happy to answer.

Mr. Currie provided recommendations for what he considered to be an appropriate wood-frame wall construction, and there are no provisions in the code that would preclude the construction that he suggests.

His correspondence was provided to the standing committee on housing and small buildings for its consideration, and was reviewed at the committee's 35th meeting, in 1988, and the minutes record that Mr. Currie's concerns may be partially satisfied by the proposed revisions to section 9-26, currently 9-25, and this is the provision that was included in the 1990 code to address the issue of air barrier

materials that are also low vapour permeance. It is also noted that some of his concerns would be addressed by changes in subsection 9-33-3. This would have been the subsection 9-32-3 in the 1990 code, and again, these address ventilation issues as opposed to building envelope and moisture transfer issues.

The 1991-'92 correspondence essentially reiterates the concerns that were raised in the 1987 letter, and this correspondence was also provided to the standing committee on housing and small buildings, and reviewed at its 41st meeting held in November 1992, and the minutes record that it would be difficult, without further documentation of the problems with code-conforming buildings, to recommend any changes to the code requirements.

In summary, with respect to the Currie correspondence, I think it's important to note that Mr. Currie's concerns focus on construction moisture and the control of moisture transfer from the interior into wall assemblies. All the evidence that NRC has seen pertaining to the BC condominium failures indicates that the source of moisture that has caused these failures is ingress of precipitation from the exterior, and that the evidence also indicates that the volumes of water that have entered these failed wall assemblies are of such a magnitude that no degree of increased air or vapour permeance would be adequate to permit dissipation of that moisture before the onset of deterioration.

So in conclusion, I'd simply like to indicate that the *National Building Code* is a living document written by the industry at large: designers, developers, builders, manufacturers, regulatory officials, owners, managers, anybody who would like to participate in the process.

It is my belief that had additional provisions been necessary to address particular conditions in British Columbia, that proposals would have been brought forward and addressed.

Thank you very much. [Applause]

QUESTIONS BY MS. ALLAN:

Q Ms. Chown, so I guess -- are you saying that if a building fails in this province, it's a result of building code violations?

A I would suggest that, given the performance

requirements specifically, that if a failure has been identified as being due to ingress of precipitation, then that building has not complied with the building code; that's correct.

Q And with respect to the changes that were made to the 1990 code, at the National Research Council, that addressed the concerns that were raised by Mr. Currie, you're saying that was just a clarification of what was already in there, that -- that the buildings could have been built successfully -- from 1941 onward, --

A That's correct.

Q -- there was nothing stopping these buildings from being built properly?

A That's correct. We -- there was, in the public domain at that time, considerable information with respect to requirements for air barriers and vapour barriers, location of same. As I indicated in my presentation, the code does not provide prescriptive requirements to describe all possible building envelope constructions. It relies on the performance requirements and the general information available, and, yes, building envelopes could have been constructed as Mr. Currie suggested, within the -- and comply with the building code requirements, and the 1990 provision, in effect, becomes a clarification.

Q A clarification. Now, with respect to the participation, you mentioned 18-per-cent representation from BC, from at least 1980, on the development of the *National Building Code*?

A On average, yes.

Q On average. With respect to that participation, now we've had Mr. David Verge present to this Commission, and he expressed to the Commission that he was surprised by Mr. Currie's comments, but then yesterday when we were in discussion, it became clear that he sat on the part 9 committee, Mr. Verge sat on the part 9 committee from I think 1979 to 1994.

A That's correct.

Q That's correct?

A Yes.

Q And you dealt with Mr. Currie's concerns on at least two of those committee meetings; did you not?

A That's correct, yes.

Q Now, just -- just to clarify. Part 9 is for housing and small buildings. The predominance of the multifamily units that we have in BC should have been built under part 5 anyway; correct?

A Not necessarily. Whether or not a building -- a residential building falls under part 5 or part 9 depends on storey height and building area, and building area is defined, in part, by location of fire walls. So one could potentially build a row of town houses three-mile-long, and build it under part 9 if you placed fire walls at appropriate locations.

Q But for the -- for multifamily units, 600 square metres I think is the --

A 600 square metres is, to state it simply, would be footprint.

Q Right.

A That's right. So 600 square metres, three storeys high.

Q So a 40-unit condominium building, three-storey-high, 40-unit, would that likely be under part 5, not part 9?

A If you were within the 600 metres and within the three-storey height, you could build that building under part 9.

Q Now, with respect to -- so the concerns that were raised, they were dealt with by the part 9 committee?

A That's correct.

Q But were ra- -- were they dealt with by the part 5 committee, too, or did they not need to be?

A With respect to the Currie correspondence specifically?

Q [No audible response]

A Let me just provide a little background information here. I mentioned earlier that, prior to 1980, the building envelope requirements for larger buildings were included in part 4. It was only after that that they were provided in a separate part, in part 5. However, responsibility for those requirements still remained with the standing committee on structural design. And you might appreciate that they recognized that they had limited expertise in that area.

The standing committee on part 5 was established in November of 1992, and they had, in effect, five or six months in order to work on revisions to that part of the code before the information had to go out for public review. So they were on a very strict time schedule. They were, however, provided with copies of the 1991-'92 correspondence, for information. It was not discussed by the part 5 committee in any depth because it had been addressed by the part 9 committee, and the part 5 committee considered that that -- the

decisions of part 9 were appropriate.

Q Now, with respect to the problems that have been identified in British Columbia in the recent past, two or three years, and you've been technical representative to both part 9 and part 5; is that correct?

A That's right, I've been with the code centre since 1991.

Q And -- and you attend all the meetings?

A I do.

Q Now, can you give us some general indication of the nature of the problems that have been raised at those meetings, from representatives from BC or elsewhere? I guess this may have been a topic of conversation in the recent three years.

A It's certainly been a topic of discussion. However, it has not been an agenda item, which is to say that proposed changes have not been brought forward to specifically address issues in British Columbia.

Q Are you saying that in the last three years, or two-and-a-half years, since this issue has been foremost in terms of construction issues in BC, --

A That's right.

Q -- no one has brought forward a request to look at the code as being a possible place to make changes, to amend this -- to address this problem?

A No proposed changes have been received to address this issue. The general understanding has been that the performance requirements address the issue in a general manner, that the information is available, there is nothing in the code that would preclude proper construction. Having said that, there seems to be an understanding that the industry does not have adequate access to the information that is available, or is not taking advantage of that have information, and consequently, in the current code cycle, proposals are being brought forward to specifically address concerns that reflect the premature failures of buildings here in British Columbia, but also elsewhere across the country and across the continent.

Q [R] So do you recall there being any discussion at the part 9 committee meetings regarding the Currie letters in the recent past?

A The last discussion would have been in 1992 at the 41st meeting.

Q Now, do you -- do you keep track of who attends the different meetings?

A We have records for recent meetings, but I don't believe we have records that go back very far at all.
Q Would it be possible for this Commission to get a list of the current members of the part 9 --
A Absolutely.
Q -- and the part 5 committee?
A Yes, it's public information.
Q Thank you. And perhaps for the last three years would be very helpful --
A Certainly.
Q -- the make-up.
A Yes. ^ ^
Q Moving to a slightly different topic, and this is detail, but I know you were here when there was a presentation by Mr. Busque regarding the type 1 vapour barrier, and the discussion around whether or not poly was optional. Can you just make -- can you just discuss that issue briefly with us?
A Certainly. Just to give you a snapshot view, my research in the last couple of days hasn't been terribly extensive, but I drew on information from the Canadian Construction Material Centre, CCMC. That program is concerned with the evaluation of building products and constructions for compliance with the code. It was previously housed at Canada Mortgage and Housing in the early-'80s. I obtained a copy of the listings from the Canada Mortgage and Housing organizations from 1982, and the listings at that time identified 37 non-poly vapour barrier materials produced by 11 different manufacturers, and between 13 and 17 of those materials were type 1. They were materials that were kraft paper based with foil laminations with or without asphalt, asphalt-coated kraft, and foil-backed Gypsumboard.
Q So it would be fair to say, then, that polyethylene, under part 9, has always been optional as a vapour barrier under any section of that code?
A That's correct.
Q Now, you weren't here yesterday when we had a presentation regarding rain-screen technology, but I -- I'm going to ask you some questions anyway, and hopefully without the benefit of that transcript, you can still answer them. Do you believe that rain-screen technology works?
A Any technology works only inasfar as it is implemented properly. It would be quite simple to build a rain-screen wall that doesn't work. So it depends on

the details. Built properly, it would be a more rugged assembly than a non-rain-screen, face-sealed assembly. But as I said, it would be proper -- it would be quite possible to build a rain-screen wall that does not work.

Q But if done properly, it should function as intended?

A Yes.

Q Now I've lost my question because I didn't write it down and -- oh, you're an architect?

A No, I have a degree in architecture.

Q But to become an architect, you'd have to have that degree; is that correct, it's just --

A I believe so.

Q Yeah. So you're just not a practising architect?

A That's right, I'm not licenced.

MS. ALLAN: Okay. Well, thank you very much. I appreciate your answers.

QUESTIONS BY MR. LEASK:

Q I just have a few questions. One is, how are these -- the composition of these committees determined? I mean, I appreciate your answer that 18 per cent come from BC, but who picks those people?

A The membership is -- candidates are -- are solicited, in general. There are notifications that go out in the popular press requesting that anybody who's interested in participating submit their resumes. Those resumes are reviewed by the chairs of the respective committees, and recommendations are forwarded to a nominating committee, which is a committee of the Canadian Commission on Building and Fire Codes, which is also an industry committee with representation from across Canada and from all the interest groups. And there's -- that nominating committee reviews the recommendations and approves or not those recommendations, and then forwards their recommendations to the full Commission for its approval. So it's very much a matter of the industry selecting from its own.

Q But the -- you're addressing one issue, but sometimes here in the periphery, we're also concerned about central Canada versus the outlying portions. The decisions are made at the centre, if I followed you correctly.

A The decisions are made at the centre only insofar as the secretariat and secretary and technical support to

the *National Building Code* are provided by staff of the National Research Council. However, the decisions themselves are made by the Commission, and the Commission is itself a committee made up of representatives from across the country, including British Columbia.

Q All right. As you're probably aware, we've heard differing suggestions as to how the code or some aspect of it may be wholly or partly responsible for our problem here. As I understand one of those suggestions, it is that the requirements for either vapour barriers or air barriers prevented the internal heat from the building from drying out the moisture that might have got past the cladding. Now, have I described a theory well enough for you to understand what I'm describing?

A This -- this is certainly a theory we are familiar with. It is not a theory we prescribe to.

Q Could you please explain either what's right or wrong with that theory?

A We believe that the air barrier and vapour barriers in building envelopes are intended to, and do, control the transfer of moisture from interior space into the assemblies by either vapour diffusion or air leakage. The evidence we have seen of the failures in British Columbia indicates that the moisture that has caused those failures has come from the exterior, which is to say that the air barrier and the vapour barrier have played no role in the ingress of that moisture, and that furthermore, the volumes involved are such that even if you eliminated the air barrier and vapour barrier, those walls would not dry out.

Q All right. Does -- I want to understand your answer as well as I can. Do you believe that construction in BC was permitting much greater ingress of precipitation from sometime in the mid-'80s till now, compared with building prior to that?

A That appears to be the case.

Q And would you comment on whether that's a design problem or a construction problem or both, in your view?

A In my view it's both.

Q The design problems being failure to design for our climate, to use a summary; is that right?

A I don't believe that climate is a causal factor here. I believe that the building envelopes, as designed, would have failed almost regardless of where the

buildings were built. We are now seeing exactly the same kinds of failures, with the same kinds of construction, in Calgary, which, as you'll appreciate, has a much drier climate. We believe that the climate in the BC coastal areas is an accelerating factor, but not a causal factor.

Q All right. So that -- and I don't want to go beyond what you're saying, but I want to say it and see if you agree. These design failures would have caused the buildings to fail anywhere in North America, virtually; is that right?

A We -- I would agree with that statement.

Q All right. And I mean, without --

A Unless there was no rain whatsoever.

Q Well, all right. I don't think we --

A Within limits, within limits.

Q -- have to worry about the middle of a desert.

A Right, exactly.

Q Anywhere where there's some amount of precipitation?

A Right.

Q And it's not a matter of taking designs that would have been appropriate in some place and bringing them here, these were badly designed buildings; full stop?

A I believe they were badly designed buildings that were complicated by the adoption of an architectural aesthetic that complicated the design issues, which is to say we're dealing with aggravating factors again. The design themselves may not have been completely appropriate, but they weren't completely inappropriate either, if the appropriate consideration had been given to the detailing.

Q All right. And that's -- that was my next question or series of questions. We've certainly heard evidence and read submissions that suggested that much of the penetration of the wall assemblies by exterior moistures came at what are referred to as details?

A Yes.

Q That is to say, windows, balconies, turrets, architectural features of that kind. Do you agree with that?

A That seems to be what the evidence suggests. That most of the rain ingress occurred at joints, junctions, penetrations. Which is not to say that some did not also agree -- also occur over the plane of the -- of the wall, but most of it appears to have occurred at joints, junctions, penetrations, and so on, at the details.

Q And we've been told two things about those details, at least, maybe more, but one thing we've been told is that it doesn't appear that at the time the buildings were constructed, the building designers gave sufficient design direction to those doing the construction. Do you have any knowledge about that?
A Only anecdotal.
Q All right. And secondly, that those doing the construction work lacked the skill or training or something to enable them to fashion waterproof detail themselves. Does that seem correct?
A Again, based on anecdotal evidence, that appears to be the case. The information we have is primarily from buildings that have failed rather than buildings at the design construction stage.
Q Several experts and the Architectural Institute of BC and the Association of Professional Engineers and Geoscientists of BC have assured us that it shouldn't happen again. Do you share their confidence?
A It would be nice to share their confidence.
Q Sure, of course, --
A This is -- this is --
Q -- the question is, do we?
A I think, I hope that we have all learned a very valuable lesson from this unfortunate situation. If in fact we have learned, then there is a much better possibility of avoiding similar situations in the future. If we have not learned, then we are doomed to repeat the -- our failures.

MR. LEASK: Thank you.

FURTHER QUESTIONS BY MS. ALLAN:

Q Ms. Chown, I have just a couple of questions related to that, then. So essentially, what you're saying is, the transfer of intelligence is critical here, to avoid this problem again?
A Absolutely.
Q And there is nothing new to be learned, we just have to all understand what's already known?
A Mostly what we are learning new these days has to do with fine-tuning. The basics are there, we've understood the basics for many many years, as evidenced by a lot of buildings that are out there and performing well. What we are doing now is fine-tuning our understanding of exactly how building envelopes perform, and consequently, trying to fine-tune design

and construction to reduce cost, and one has to be very careful how close to the line one treads when doing that.

Q Well, since the biggest challenge I think we face in the next three to five years is the repairs of the buildings that weren't constructed -- designed and constructed properly, do you have any thoughts about how you go about repairing a building with the design and the details that have caused the problems?

A It's obviously a very complex question, but to give a very simple answer, we need to go back and look at the very basics of building design construction, and not try to simply deal with the symptoms. For example, a lot of the failures have been related to flanged windows. One cannot expect to provide a retrofit that will perform on -- perform adequately for any length of time unless you address those windows as well.

Q So that -- that some of the repairs that are looking at perhaps taking a face seal and turn into a rain screen could be -- could make some sense?

A They could if, as I suggested before, one addresses the details, because one can build rain-screen walls that will also fail.

Q So for example, some of the designs that -- for repairs we're looking at where they've added overhangs, that that might make some sense in given -- given a particular system?

A It certainly can't hurt.

MS. ALLAN: Okay. Thank you very much.

MR. BARRETT: I want to thank you very much for your presentation. It's a very complex issue, and I had an education in an area that I didn't think I was capable of understanding. But one thing that sticks out is the statement you made of the gentleman of 150 years ago, plus a study done by -- I think it was you or CMHC -- that said simply, "90 per cent of the buildings that have overhangs don't leak." I don't think this is rocket science.

MS. CHOWN: This is not rocket science.

MR. BARRETT: Thanks very much.

[Applause]

MR. BARRETT: We are now adjourned till two o'clock this afternoon.

[LUNCH]

July 12, 1999

Homeowner
Protection Office

J.C. Currie
910 Mount Road
Hornby Island BC V0R 1Z0

FILE

Dear J.C. Currie:

Thank you for your letter dated May 25, 1999 regarding your concerns about the Building Code. The Honourable Jenny Kwan, Minister of Municipal Affairs, has asked me to respond on her behalf. While you did not make a presentation to the Barrett Commission, your viewpoint was definitely represented there.

One of the Barrett Commission recommendations was to establish the Provincial Advisory Council on Homeowner Protection (Council). The first meeting of the Council has already occurred, and it is anticipated the council will meet at least four times a year. The mandate of the council is to advise and make recommendations to the Homeowner Protection Office (HPO) regarding improving the quality of residential construction in British Columbia, research and education and consumer information initiatives. This includes:

- advising on the main program areas of the HPO: Homeowner's Reconstruction Loan Program; Licensing of Residential Builders, Warranty Regulations and Implementation and Research and Education;

- identifying new and emerging issues in the residential construction industry and making recommendations on appropriate responses to the HPO; and

- advising on the Research and Education components of the HPO particularly as they relate to building science matters, Building Code (both provincial and City of Vancouver), cost effective building techniques and consumer education.

It is anticipated that reviewing building code matters will be identified as one of the priority activities for Council's 1999 – 2000 agenda. If you would like further information on the Provincial Advisory Council, please contact myself or Karen Hemmingson at 646-7050.

Yours truly,

Shayne Ramsay
Chief Executive Officer

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May 25, 1999

The Honourable Ms. Kwan,
Minister of Municipal Affairs,
Parliament Buildings,
Victoria.

Dear Madam Minister,

Re: Leaky Condominiums

On Dec. 12, 1991, I wrote to Mr. Blencoe, one of your predecessors, regarding the inevitability of serious moisture problems with wood-frame construction, for convenience a copy of that letter is attached. Earlier, while still employed in your Ministry, and after becoming increasingly concerned over the direction being taken by the National Building Code, I expressed my feelings in writing to the NRC. A copy of that letter, dated Dec. 1 1987, is also attached, together with a letter from one of the many Architects who shared my concerns. Details of my background were given in my letter to Mr. Blencoe.

While I have headed this letter "Leaky Condominiums", which seems to be the common reference used, I think the term is incorrect. The real issue is moisture entrapment in sealed wall systems; in virtually all cases this would involve wood-frame construction. I should add that my concerns were not based on academic theory, but on well established principles of basic building science.

Currently the situation, which was largely avoidable, is a total mess, and referring to it as the tip of an iceberg would probably be an understatement. While bigger buildings understandably are the first affected, smaller homes are almost certain to follow, in fact they may already be involved but simply have not attracted the same media attention as major structures. When moisture problems first surfaced I was obviously interested, and while I did not inspect any of the sites, television coverage clearly showed the existence of rampant dry rot. All references were to leaks and poor construction.

Eventually a welcome, if overdue, investigation into the issue was announced. I made no submission to the enquiry, as your Ministry already possessed the details, and presumably made these available. However, when the report was published I was disappointed that it seemed to be largely a political exercise. Obviously no serious investigation into the reasons for the problems had been made, blame appeared to have been decided beforehand.

Generally anybody finding water problems and rot within their house would tend to conclude automatically that the cause was either bad design, poor workmanship, or inferior materials. Very few would think of questioning the actual requirements imposed on a building by our Building Code. It does however seem strange that nobody asked why, after generations of building wood-framed structures, new buildings would suddenly start failing within a few years, and all in a geographical area with a particular type of winter climate. Even if leaks really were responsible, most buildings at some time will inevitably develop a leak, normally this indicates that something such as a flashing, roofing, or other feature, requires attention. In past years the problem was merely fixed, and any wetness dried out. Never ever, until now, has this necessitated major reconstruction of the building. Blaming the industry was a convenient red herring, diverting attention away from other directions, although I cannot believe that some of the people involved were not aware of the real situation.

On the matter of responsibility it is my firm opinion that the blame lies with the Building Code. In reality our designers have never lost their ability to design, our builders to build soundly, and our inspectors to carry out their work competently; I think they are equal or superior to those in any other province. There will always be a small percentage of problems in these areas, but this is no different to any other function and must be expected. The industry and the public have been failed by the very measures supposedly intended for their protection.

At this time I think everybody must realise that we have a major disaster. It began when energy conservation became a serious issue, due to the oil crisis. One prime source of heat loss was air leakage from heated buildings, and the Building Code addressed this in houses by introducing measures to prevent air escapement, basically attempting to make buildings airtight. Unfortunately this was carried out with a total single-mindedness that took nothing else into consideration. For housing we had vapour barriers, air seals, airtight windows, and this coincided with the introduction of panel type sheathing such as plywood and waferboard. This sheathing replaced the old shiplap boarding, it was more economical, and easier to install; unfortunately the fact that glue lines in plywood and the resin binder in waferboard were impermeable was ignored, whereas shiplap permitted a wall to breathe.

Presently the Building Code basically requires both interior and exterior seals for a wall. We live in an area of high winter humidity, and this factor plus the very large quantity of moisture generated by a normal living process, makes it essential that excess moisture is able to escape, if it is unable to do so, it will condense. With an effective vapour barrier the condensation will occur in the drywall. However, the realities of site construction make a perfect vapour barrier unachievable for all practical purposes, and the vapour penetrates the wall system, where it is trapped by the impermeable outer construction. At this location it condenses and accumulates. Added to this, if and when a building does develop a leak, then this moisture would also be trapped within the wall system. However, I have no doubt whatsoever that

the majority of failures are due to moisture from within the buildings, not leaks. In fact I recall one failure in Sydney, where reconstruction cost about $300,000; the developer stated that the problem was not leakage, but internal moisture.

To complicate the situation we have the usual attitude of a genuine bureaucracy, and Ottawa most certainly falls into this category, -- it will never ever admit to being wrong. Once a policy is decided, then it will be followed regardless, and if it causes harm, additional measures are added to alleviate the damage being caused. There will never be a reversal of policy to simply remove the factors causing problems, this would be an admission that an error had been made in the first place. Consequently we now have an energy conservation program that is harmful to the occupants of dwelling units, is a total disaster in the climatic conditions of south-western B.C., and will not be changed without direct instructions from our elected politicians.

To make things even worse, people are being put through incredible suffering, watching the biggest investment of their lives fall apart, and being required to take on huge additional debt burdens to correct problems that simply should never have happened. However, what really angers me is that many of these people, rebuilding in good faith, will probably be going through the same exercise again in a few years. They are rebuilding to the same Code requirements responsible for their problems in the first place.

My letter to Mr. Blencoe was acknowledged by the Minister, and a later letter from your Ministry stated that a small task force would investigate my concerns, and asked for details of any occurrences of which I was aware. As I was predicting a future situation a reply was pointless, and I have no idea what happened with any investigation. Mr. Blencoe's letter also stated that the preparation of a new House Code would be a top priority of the Ministry, and this would address my concerns. I found this interesting as I had offered the Ministry a completely new House Code in March 1990, free of charge. This would have remedied the Code problems and would have been ready for use by early 1992; this offer was turned down.

It is unfortunate that my letter generated no action; as I think the situation, which was predictable and inevitable, could have been considerably minimised or even averted by steps taken at that time, or by a new House Building Code. However, I assume that at least some action must have been taken on the strong recommendation made in my letter, that the Ministry obtain some form of indemnity from Ottawa for any troubles which could be attributed to the requirements in the NBC. If for some reason this was not followed up, then we have a provincial headache, which could finally cost our taxpayers several hundred million dollars to fix.

Presently we have a position where the house building industry is being unionised, levies are being imposed on new construction, an additional level of bureaucracy has been created, we even have self-styled "building envelope specialists". In my opinion the new measures actually increase the chances of future

building failures. There is a warranty program in place, provided by insurance firms; this is nice, except that it is said to be conditional on construction to provincial regulations. Unfortunately the first court case which finds the Building Code at fault, will no doubt invalidate the warranties. Making the construction industry a scapegoat also seems to have resulted in an unjustifiable public loss of faith in the industry, leading to a decline in demand for new units.

If the exterior walls are once again made "breathable", it will, in my opinion, save thousands of dollars in housing costs, eliminate the problems now being encountered, including the need for experts like "envelope specialists", eliminate excessive condensation, and eliminate the dangers from pollutants such as radon gas, a hazard which is dangerously overlooked. There is absolutely no reason why modern materials cannot be used to eliminate any problems inherent with old buildings, and still permit the escape of water vapour and pollutants, with only a negligible heat loss.

There is one interesting side to the situation, in that sub-standard construction may have actually prevented problems in many buildings. By this I mean construction which does not comply with the Building Code. I have certainly seen sites in the Victoria area where obvious provisions were taken to open up exterior sheathing, I think this was the result of competent builders knowing that the Code provisions were bad, and competent inspectors turning a blind eye to such transgressions.

For the future I think problems can only escalate each year, and I hope the Ministry will proceed, as a matter of urgency, to make the provincial Code changes necessary to eliminate the problems. There is simply no point in waiting for action by Ottawa, they have long been aware of the Code shortcomings, and have taken no effective action. To alleviate the strain on the people involved there is simply no time for bureaucratic stonewalling.

Yours sincerely,

J.C.Currie FRICS.

4375 Parkside Crescent,
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December 12, 1991

The Honourable Robin Blencoe,
Minister of Municipal Affairs, Recreation and Housing,
Parliament Buildings,
Victoria, V8V 1X4

Dear Sir,

While employed by the provincial government as Director of the Building Standards Branch, a position held until retiring in 1988, I became extremely concerned over the direction taken by the National Building Code with respect to house construction; as you know, the NBC with minor changes constitutes the building code for every province in Canada, including British Columbia. I was also Chairman of the provincial Building Code Appeal Board from 1973 until 1990, a position that often necessitated a detailed analysis of specific Code provisions. I feel that the situation is now becoming so serious that I have no alternative but to draw it to your attention; I apologise for the length of this letter, but did not wish to make statements without providing some of the rationale.

My concerns stem from what appears mainly to be a blind pursuit of energy conservation, to the complete exclusion of all else, jeopardizing both the health of occupants and structural integrity; all building codes must compromise, without it buildings could not be erected, unfortunately on this particular issue there is no compromise. I consider that the traditional concept of a house as a building in which average people can afford to live in health and comfort with expectations of a reasonable building life, has been lost; we are moving towards the construction of excessively complex and expensive mausoleums, with a relatively short life. I wrote to Ottawa in 1987, outlining my feelings on the matter and a copy of that letter is attached; there was no response, but I was drawing attention to a deficiency and bureaucracy never accepts that it may have made a mistake. Since that time the 1990 NBC has been published, and is in process of being adopted by British Columbia. From an initial examination of this edition I can only conclude that the situation is becoming worse, in fact it seems to be clearly out of control, and Ottawa is not capable of dealing with the issues. The problem of structural integrity is also

seriously compounded by the climatic conditions prevailing on the west coast, we have high humidity winters, those in central Canada are dry in comparison, although Ottawa must be well aware of this difference as the Code includes the necessary climatic information for design purposes. Bizarre though it may seem I think that our Building Code, produced for the express purpose of protecting health and safety, is actually mandating conditions which are not only detrimental to health but also seriously shorten the life expectancy of a wood-frame house, with the latter condition particularly applicable to B.C. I have also found this feeling regarding the Code to be remarkably widespread, those dealing with the practicalities of construction are well aware that wood simply should not be used as is now required by the Code

Several years ago we experienced the urea-formaldehyde foam fiasco. As a point of interest this material had previously been submitted for approval on government buildings, through Public Works. At that time it was rejected by myself; the reasons for rejection were definitely not confined to possible formaldehyde gas emissions, it had other very obvious deficiencies. It was therefore something of a surprise when CMHC not only approved its use in houses, but even subsidized installation; had it not been for their actions B.C. would never have experienced the urea insulation problems. The only reason I could reach for the CMHC approval was failure to consider anything other than the specific thermal properties of a dry insulation sample, whereas we also looked at all characteristics including installation and effects on other materials in a system. Basically the approval was a major error, which in total must have cost taxpayers hundreds of millions of dollars. To be extremely charitable the CMHC action did not display an outstanding level of technical judgmental capability.

My reason for mentioning the urea-formaldehyde issue is that I think we are now in a worse situation, and for the same reasons. It is also quite possible that eventually far more costly remedial action will be required, although some health effects are likely to be so insidious that it will be years before they become apparent. Basically we are now building sick houses, but unfortunately the factors leading to the potential problems are not an option for a designer or builder, they are mandated in our Building Code.

As mentioned previously energy conservation is the major justification for many of the questionable measures, but is not the sole culprit. New materials are brought into use, each with benefits over something previously employed; for these it seems that the same philosophy which led to the urea foam disaster is still being followed, with each product being assessed in isolation. As an example, plywood and waferboard have virtually replaced

shiplap for exterior wall sheathing. These are excellent materials for their purpose, easy to install and providing more rigidity to a wall assembly than shiplap; however, unlike shiplap, each product is also a very effective vapor barrier and with their use wall studs are denied the opportunity for necessary continued drying after installation, despite any slight gaps between boards; this is ignored by the Code. The situation is worsened by an interior vapor barrier, installed on the warm side of the insulation, normally polyethylene sheeting The wall of a house consists of a system involving different materials, and it is simply not possible to have a 100% seal over the entire wall area, edges can be taped, and all possible care taken, but the vapor barrier at some point, at some time, will have defects. Each defect in the film will result in a concentration of moisture at these locations, increasing the moisture content of the wood framing; there is no point in also commenting on the fairly recent discovery that polyethylene was actually failing in service, necessitating a new standard for a higher quality of material; if the vapor barrier was considered critical in the first place this has certainly left an unfortunate legacy for thousands of home owners who faithfully complied with the Building Code.

The current policy generates two problems, relating to health and structural integrity. With respect to health we simply do not know what contaminants are being trapped in our hermetically sealed houses; using radon gas as an example it will be years before cases of lung cancer can be documented to the extent that causes can be pinpointed, although current information clearly indicates a serious hazard. We also know that excessive condensation is fairly common in BC; however, the narrow approach followed for materials is also applied to problems, and solutions for humidity range from the installation of dehumidistats or dehumidifiers and the partial air conditioning now required by the Code. There is never an attempt to go back, identify, and correct the condition leading to the problem; as I said earlier, this would be an admission that the wrong direction had been taken in the first place.

In the case of structural integrity I think we have a potential problem with far more obvious results, in fact I am sure that the situation already exists, but will not develop seriously until people start putting together information from different locations, and the media become involved. The problem relates directly to the use of wood in construction; this is a natural material, and as far as nature is concerned wood framing is simply dead wood, subject to the natural mechanisms which break down organic materials. Traditional good construction provided for this situation by installing wood under circumstances which eliminated most of the conditions necessary for destructive organisms; we can modify materials to gain certain benefits but the fundamental properties of the

basic substance remains unchanged, unless the material is essentially poisoned as a food source for these organisms. Without such treatment wood installed in detrimental circumstances can be attacked by fungus, generally two types are involved - wet rot and dry rot; the first is relatively easy to deal with and is, to a limited degree already addressed by the Code, which requires protective measures to prevent wood from being subjected to continuously damp conditions unless treated with a preservative. Under normal circumstances wet rot is reasonably easy to prevent, and to eliminate when it occurs; once the moisture content of the wood is adequately reduced, the fungus will die. However, the Code does not address dry rot which, in my opinion, will be a serious problem in future; this is a particularly destructive fungus, extremely difficult and costly to eradicate. The reason for my belief is very basic - the Code simply ignores the fundamentals which are necessary to ensure a satisfactory service life for wood.

I initially qualified professionally in the U.K. as a Chartered Surveyor, and at that time gained considerable site experience, including trouble-shooting on building failures; in the case of timber it was not uncommon in older buildings to encounter dry rot (merulius lachrymans), a fungus requiring humidity and dead air to become established. Once in place it can spread throughout a building to areas of dry wood, feeding on moisture in dry areas by means of mycelium or threads, running from its parent fruiting body. I have heard it referred to as wood cancer. When detected dry rot was never easy to completely eradicate, as the spores easily spread; at that time we normally flame-treated all nearby masonry, cut out and replaced affected wood, treating this and all adjacent areas with an extremely toxic preservative, and we completely eliminated the cause of an outbreak to prevent recurrences. The fungus has been known to travel up to 30 ft. through solid masonry to reach additional wood food sources. In Canada I was pleasantly surprised to encounter no dry rot, but realised that conventional wood-frame construction did not provide a suitable climate for this particular fungus; the use of materials such as permeable siding, and shiplap sheathing, allowed walls to breathe. Basically wood was used in a manner which did not facilitate the establishment of wood-destroying fungi, resulting in structures having an excellent life expectancy, with dry rot being relatively unknown. I would add that if dry rot becomes established in one of the typical wood frame houses common in lower B.C. eradication is liable to be extremely drastic and very costly.

Under the circumstances I found it hard to believe that our Building Code could be moving in a direction which would result in the creation of virtually ideal conditions for this particular fungus; in fact it would be difficult to provide an environment more suitable for this purpose. I drew attention to the issue,

but without success, and as the Code continues to ignore natural processes I feel that those in authority, with responsibility, should be aware of the situation. We are placing wood framing in a system where it is unable to dry out initially, and is almost certain to acquire a higher moisture level when in service; it is also installed in a dead air location. It is critical, both for health and structural life, that the Code direction be reversed, to ensure that a house purchaser can expect not only healthy living conditions, but also a structure that will have a reasonably trouble-free life span. It is more than likely that the IRC will state that the Code is the work of independent committees, not following their directions; to anybody with knowledge of the code writing process this concept would be utterly ridiculous, IRC not only set the direction but provide research advisers for each committee; these advisers are fully responsible for direction and content.

Quite apart from the distress and costs to homeowners it is not unreasonable to anticipate lawsuits if situations develop as I anticipate, in fact I would regard them as inevitable; we are, after all, dealing with the largest purchase in the lifetime of the average person. We are also dealing not with conditions of choice for a house builder, but conditions which are mandated; under the circumstances the result of a legal action is predictable. The federal government must shoulder the major responsibility, but as the NBC is only a recommended standard until adopted, the provinces also acquire liability; similarly there will be liability at municipal level, they are enforcing provisions that many know to be harmful. While it would not protect those who would eventually pay the bill - the taxpayers- I suggest that the province may wish to protect itself from involvement in liability. As the federal government is recommending these measures, they should be quite prepared to indemnify the province and municipal governments from claims incurred through following their recommendations.

Yours sincerely,

J.C. Currie

cc B.C. Building Standards Branch

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July 13, 1999

The Hon. Ms. J. Kwan
Minister of Municipal Affairs
Parliament Buildings,
Victoria, BC

Re: Leaky Condos

I have become aware of Mr. J.C. Currie's recent correspondence to you (May 25, 1999) on this subject. I am concerned about inaccuracies in his letter, and feel compelled to draft this response.

As Mr. Currie refers to his correspondence with Mr. Blencoe in December 1991, I am enclosing a copy of comments I prepared at that time. Although the substance of the piece (and the references cited) could be updated, it remains correct.

In late 1997 I prepared a paper for the Building Policy Branch on the issue of building envelope failures and the code. The paper was posted on the Ministry's web site.

Re: "dry rot"

The writer continues to refer to "dry rot". Forestry biologists say that most of the problems we see in BC is with wet rot. Dry rot is rarely seen here. There is a difference in the action of the two.

Re: Building Code

The writer puts blame for recent problems on the building code. One of the most significant features of the Canadian codes development process is that it is not done behind closed doors by bureaucrats. The National Building Code (NBC) is a model code developed in an open process by committees with representation from all sectors of the industry. All requirements are based on sound building science. Anyone is invited to participate by providing suggestions and commenting on proposed changes - and many do. This has been the process for many years, and many code revision cycles.

Historically, each province has reviewed the content of the NBC each time a revised edition was prepared. In BC we parallelled the national consensus review process, duplicating much of the

national effort without benefit of technical expertise in all matters, and incorporated many BC specific code requirements. If I am not mistaken, Mr. Currie was responsible at the time when the code review process for BC was expanded. If Mr. Currie seriously believes that the fundamentals behind code requirements were at fault, he was in a position to make those comments, and even influence the BC Building code requirements at the time.

In addition, he mentions that all problem references in the media reports were to leaks and poor construction. We need to remember that Building Codes set out minimum standards. Poor construction is not something that can be attributed to code standards, unless the standard itself is incorrect. (While that may happen on occasion, it has never been proven that is the case in the case of the envelope failure problem).

Re: Energy Efficiency at fault

The attempted introduction of energy standards into a code has generated considerable debate in the industry. However, the building envelope air tightening provisions in the code have nothing to do with energy use, but everything to do with basic building science. They were introduced as a result of a better understanding of how buildings work.

Air movement is the force that drives significant amounts of moisture into a structure, where it can lead to deterioration.

It is totally incorrect to state that the "we have an *energy conservation program that is harmful to the occupants of dwelling units*". This is a statement that is without foundation.

Re: Building code requirement for "both interior and exterior seals for a wall".

There is no such requirement in the code. The code requires that vapour diffusion must be contained, and the building envelope must minimize the amount of air movement through it. That is why the code maintains a requirement for a *vapour diffusion retarder*, and for an *air barrier*. These are two distinct functions. The code does not explicitly state how they are to be built. The same materials may provide both functions, or different materials may do the job.

Requirements for mechanical ventilation in the code are meant to address indoor air quality and indoor generated moisture control (both health and safety concerns). Too often, these systems do not perform as intended.

All the evidence points to moisture problems in the envelope as being caused by exterior moisture finding into the building envelope.

Re: "self styled building envelope specialists"

The writer is doing a disservice to many building industry professionals who have spent

considerable time familiarizing themselves with the issues, and upgrading their building science background. The specialization focuses attention on identified problem areas, with the intent of minimizing problems in the future. It should be considered as part of proper, professional design and quality assurance procedures performed by competent industry professionals. If the same level of service had been exercised over the past decade, we would not be facing the situation we are seeing today.

Yours sincerely,

Richard Kadulski, MAIBC

Re. Comments on Changes to B.C. Building Code
Referenced in letter by J.C. Currie to the Minister of Municipal Affairs, dated Dec. 12, 1991

Some of the issues raised by the writer are the writer's opinions, not dealt with or related to the code, and on those we do not wish to comment. (Urea Formaldehyde Insulation (UFFI) was never mentioned in any code). However, there are several technical errors that should be identified and corrected so as not to leave false impressions.

Changes to the code have been made not in pursuit of energy conservation, but rather to address changes in building technology. In most cases the changes are being made because of the recognition that a *house is a system*, greater than the sum of its parts. Houses are becoming more air tight because of changed construction prices, driven by market pressures for more comfortable draft free homes and increased use of panelized materials.

While the code now stresses tighter construction, there are no requirements for air sealing. Conventional housing is not "hermetically sealed". Airtightness tests done in Delta on a range of normal market housing built in accordance to the present code requirements (after the implementation of the 1987 code, to verify the impact of the code,) indicated that on average they had 6 air changes per hour at 50 pascals pressure difference. This is still much looser than the 1.5 air changes required by the R-2000 program. Most infiltration/exfiltration takes place at junctions and penetrations.

> *"plywood and waferboard...a very effective vapour barrier....are denied the opportunity for necessary continued drying after installation"*
> *"we are placing wood framing in a system where it is unable to dry out initially, and is almost certain to acquire a higher moisture level when in service."*

There is no evidence to support the writer's contentions. Numerous studies have been done, over the past few years to determine whether impermeable exterior panels are indeed a cause of moisture problems, and there is no evidence to confirm this hypothesis. In virtually all tests, framing moisture levels over 12-24 months after the house is stabilized at dry conditions (9-12%).

The New Home Warranty Program of B.C. has not had any changes in the incidence of moisture related problems or claims.

Vapour barriers must be used to avoid the diffusion of moisture through the construction. It has been identified that air movement through the building envelope is the major driving force that moves moisture into the construction. Vapour barriers are important, and must be placed on the interior to reduce diffusion. At the same time, an effective *air barrier* reduces the pressures acting on the building envelope, which means that the air barrier must be continuous, while the continuity of the vapour barrier (in the presence of an effective air barrier) is less important.

An effective air barrier and vapour barrier will in fact enhance the durability of the structure.

Excessive condensation is fairly common in B.C.

Condensation is evident even in older houses, especially those that are electrically heated. (Pressumably these were built following older building practices and approaches). The cause for this is inadequate ventilation and moisture control. Dehumidifiers are not the solution.

Radon gas inside houses is caused by tight construction.

Radon is a factor that must be considered in some areas, and is determined by local geology. High concentrations in buildings have been observed even in leaky houses. Radon (a ground gas) enters a house through cracks in the foundation. Higher concentrations have been noted in many older houses located in sensitive areas. The remedy for radon is sealing the below grade portion of the house and providing sub-basement ventilation. Monitoring of R-2000 houses has not detected any significant concentrations of radon gas in the tight houses; in fact they were lower than for conventional houses. This issue is being dealt with in the 1990 version of the code.

Airtightness tests of merchant built houses (i.e. not particularly energy efficient) have shown that many houses are already sufficiently tight to warrant special measures to provide fresh ventilation air. A draft position paper prepared by the Technical Research Committee of the Canadian Home Builder's Association states:

> *The results seem to indicate that a majority of houses being built in Canada using normal construction practices are close enough to being airtight that air leakage through the envelope cannot be relied upon to provide, at all times throughout the heating season, the rate of air change which most authorities judge to be necessary to maintain adequate indoor air quality in normal households.*

The code must address the reality that houses are being built tighter, and as there is a greater use of non-forced warm air heating systems, ventilation is not always adequate.

The addition of a requirement for mechanical ventilation in the last revision of the code was the technically correct approach to address the health and safety issue of proper indoor air quality in houses.

At the moment there are no practical approaches to provide passive ventilation in today's houses. Even older houses that were built in an era when houses were very leaky did not have adequate ventilation for occupancy. Passive (or "natural") ventilation does not provide adequate air flows unless the temperature difference between inside and outside is maximum, at which time uncontrolled air movement takes place, thus adding to occupant discomfort, to the point that people do all in their power to plug up the sources of drafts, rendering any possible benefits from the air flow meaningless. During a large portion of the year there is just not enough driving force to adequately ventilate the house to maintain good indoor air quality.

Wet rot is easy to prevent as the writer notes, and this is done by creating conditions that will avoid moisture accumulation in the structure. Occasional wetting of the structure is not a significant problem providing that the wet area has a good opportunity to dry relatively quickly. As the writer observes, dry rot has not been observed to be a problem in B.C. so is not relevant to the discussion.

Exterior and interior sources of moisture can contribute to create conditions for rot.

Usually these conditions are caused by a failure in materials or workmanship.

A discussion could take place regarding the direction that codes art evolving, and how prescriptive or otherwise the codes may be becoming. However, as long as codes identify specific actions that must be taken, they must remain technically correct. A purely performance based code may be possible, but it's a philosophical approach for a different discussion.

References

Many studies have investigated moisture problems in wood frame construction related to the building's tightness and implications on building durability, indoor air quality and structural durability. Some of these include:

Construction Principles to Inhibit Moisture Accumulation In Walls of New Wood Frame Housing in Atlantic Canada 1985, CMHC NHA @855
The Difference Between a Vapour Barrier and an Air Barrier 1985 National Research Council of Canada (NRC) BPN 54
Humidity, Condensation, Ventilation in Houses 1984 NRC, NRCC 23293
Moisture Problems In Houses 1986. NRC CBD 231
Building Science 1990 Joseph Lstiburek, study prepared for the US Department of Energy and privately published
Moisture Problems CMHC Builder's Series document
1989 Survey of Airtightness of New, Merchant Builder Houses technical paper by John C Haysom (NRC) and Ross Monsour (CHBA) Indoor Air Quality: IAQ 1990 conference, Toronto
Ventilation and Airtightness of new detached Canadian Housing T. Hamlin, J.C. Forman, M. Lubun, CMHC, 1990
Ontario Wall Drying Project, CMHC
Flair Homes Energy Demo/CHBA Flair Mark XIV Project A series of technical reports of an extensive monitoring program, available from the Building Group, CANMET, EMR Ottawa,

Province of
British Columbia

Ministry of
Municipal Affairs

Parliament Buildings
Victoria
British Columbia
V8W 3E1

COPY

YOUR FILE

OUR FILE DL-87-70

December 1, 1987

Mr. J.F. Berndt
Deputy Chairman, ACNBC
Inst. for Research in Construction
National Research Council
Montreal Road
OTTAWA, Ontario
K1A OR6

Dear Mr. Berndt:

I have for some time been concerned over the direction taken by the National Building Code with respect to energy conservation in houses, and from the content of the current edition feel it could be beneficial for a more open expression of feelings.

Without dispute energy should be conserved. Undoubtedly the vast majority of people are in full agreement, and it is questionable whether any houses are now constructed without thermal insulation, generally at a higher level than required by codes. The reason for my concern is the insistence on airtightness without, in my opinion, adequately considering the effects.

We are dealing with a document which sets minimum standards for health and structural sufficiency. At present, incongruous though it may seem, it may actually be causing health problems, and also be creating the potential for some early structural failures. Basically I feel that in responding to excessive enthusiasm in certain areas, the Code has gone in the wrong direction, and should now take a very definite step backwards.

Page 2 ...

I attach an outline of my rationale, which I have confined to wall construction, and suggest that we consider two options for houses. The first would include the basic requirements, adequate to ensure health and safety. The second, for owners wishing to achieve a higher comfort level such as full or partial air-conditioning, would have the additional steps necessary to prevent such provisions from endangering health.

The second option should not be mandatory, although the current Code content is well on the way to establishing such a situation. A house is a simple structure, a necessity for normal living at an affordable price, we seem to be turning it into a scientific achievement.

At this time we are moving rapidly towards the development of a house building code, a simpler set of requirements for this type of building. It is essential that a clear direction be established on the issue raised before it becomes enshrined in the new document. I would add that the situation has been discussed with others in the industry, and it is fair to say that there is general concern.

Yours very truly,

J.C. Currie, Director
Building Standards Branch
(387-4010)

JCC/cs

J.C.Currie
Building Standards Branch,
B.C.
Dec. 1st. 1987

Airtight Houses

Traditional wood-frame construction placed lumber in a situation favourable to a long life. Wall studs, whether green or relatively dry when installed, dropped to an acceptable moisture level in service through the permeability of wall construction, which allowed the ready passage of water vapour to the exterior. The exterior sheathing of shiplap plus a permeable cladding contributed to a "breathing" system.

Subsequently, the different components have been "improved" through the development of new materials, and new philosophies have changed components, all to improve individual performances in response to perceived needs. With these developments it would seem that sight has been lost of the basic fundamentals which ensured the longevity of a wood-frame structure. We have had the capability of improving and still retaining the advantages, but have dealt with the issues piecemeal, probably in response to special interests, and apparently without regard to the overall situation. The end result seems to be that we are taking steps to correct problems that we ourselves have created.

Currently it is standard practice to use plywood or waferboard sheathing, and this in itself constitutes a vapour barrier, effectively preventing the migration of water vapour to the exterior. It appears to have been assumed that sufficient leakage existed to permit drying of the wood frame, provided that a very effective vapour barrier prevented the further passage of water vapour from the interior. An additional complication is the increasing use of impermeable exterior cladding.

A still further problem is the inclusion of the term "air barrier" in the Code. This is an undefined, nebulous object, interpreted by devotees as anything from permeable Tyvek to a zero perm plastic/rubber asphalt sheet. To say that it is causing confusion would be a considerable understatement, yet I think, as indicated later, that it is a critical factor for a successful wall system.

I contend that this is extremely poor construction. The moisture content of lumber when installed is required by the Code to be 19%

or less, a level classed as "dry" for grading purposes, but I question whether this is ever checked on a building site, and lumber is regularly "green" or even saturated when delivered. With reasonable weather conditions the surface moisture will quickly evaporate, but the framing could be enclosed long before reaching the 19% level. At 20% or more, with the material located within an unventilated space, we have a condition ripe for wood fungus, and I would anticipate that even dry rot, a fungus previously uncommon in wood-frame housing, could become prevalent. It has been suggested that the small gaps required between sheathing panels would permit drying out, but this is unrealistic optimism. The situation is even worse with the apparent failures of polyethylene, generally used for vapour barriers, leaving the interior surface relatively unprotected, but still with an impermeable outer system. I question whether normal lumber will be capable of withstanding the treatment to which it is now subjected.

In the area of ventilation I think we also have a serious problem; there is an obvious need for breathable air, in addition to the air requirements for the usual air using appliances, but airtightness is placing this in jeopardy. For health I assume that an air quality as good as that existing outside is the ultimate achievement for our purposes. The question of comfort factors is irrelevant unless they impinge on health. In the past it has been acceptable to open windows for ventilation, and this, coupled with the usual air leaks has provided a reasonable level of health safety. We have now sealed all the leaks, making a house virtually airtight, and are requiring mechanical ventilation. Whether intended or not we are halfway towards full air-conditioning, and unless we reassess the situation have no alternative but to go the rest of the way, certainly beyond the R2000 standard.

In sealing a house we have prevented the normal action which resulted in the dissemination of contaminents to the outside air, through a permeable structure. Initial problems have included the urea-formaldehyde fiasco, and while this highlighted the issue of contaminent entrapment, the bottom line is that we simply do not know at this time exactly what hazards we are trapping within sealed houses. Minor substances, ignored in the past because people were simply never seriously exposed to them, may now surface as major issues. One which comes readily to mind is radon, written off in the past as a problem only in certain geographical areas, but now being looked at on a continental basis. It may take years for the incidence of lung cancer associated with this substance to show an increase, but by then it could be too late. To guard against this problem will require sealed basements, something not yet addressed in the Code. In effect we have created a potentially hazardous

environment without building in the necessary protective measures. When we seal a house we must assume entrapment of airborne contaminents and remove these mechanically, and must also prevent ground based contaminents from permeating into the house. With these general principles we at least protect occupants to a reasonable degree from future hazards, as yet not understood. However, whatever name we choose to use, we are basically dealing with the air-conditioning of houses, and this is a contentious issue. I do not believe that the Canadian public is ready to accept this as a mandatory requirement, on either philosophical or economical grounds.

I think that the Code should take a very definite step backwards, and accomodate the original fundamentals of wood frame construction. For this purpose I suggest the following:

(1) If the exterior cladding is impermeable, then require that it be spaced out to ensure rear ventilation.

(2) Provide a permeable air-barrier, "Tyvek" is ideal for this purpose, over the sheathing. This should be tightly fitted at all openings, to prevent wind penetration into the framing system.

(3) Sheathing should be at least as permeable as "Tyvek". For this purpose the normal plywoods or waferboard should not be acceptable unless spiked or otherwise treated to ensure adequate permeability.

(4) Install thermal insulation between the studs in accordance with normal practice, but omit an impermeable vapour barrier. I am unconvinced as to the necessity of a highly impermeable vapour barrier except under extreme cold conditions, and feel that this was a requirement generated mainly in an attempt to solve problems created by the use of an impermeable outer system. With a breathable outer system I would prefer something similar to the old kraft paper on the inside, or even standard painted drywall without a separate vapour barrier.

(5) Provide make-up air for the interior. We would be removing the worst air leakages by using Tyvek but I think that appliances, such as fireplaces, using air for combustion should have a direct supply from the exterior. I would make no mandatory provision for other air-using appliances, I think there is a sufficient cushion in air availability normally to accomodate these, and there should be the capability of opening windows.

I think that mechanical ventilation, heat recovery systems, and the other aspects of full or partial air-conditioning should be an alternative. If followed, this should be complete, including sealing the general structure and basements. These would be comfort provisions for the occupants, but would still require the permeable outer system mentioned above.

Such a system should, however, be a clear option for an owner. They could either build to the minimum standards necessary for health; or, they could exceed these if a higher level of comfort was considered desirable, but still without compromising health.

from the desk of **Louise Kneebone**

JR

Dec 31/91

To: Leta Hodge

Re: Letter from Jim Currie concerning National Building Code

The Minister has asked that this letter be brought to the attention of Gary Harkness for background & a suitable draft response.

Thank you.

Louise

Jim -
Please take this.
Jack

Cathy:
I need Branch comments on this by Jan 14/92.
A copy is already being circulated.
Thanks
Jack

7 *

Ministry of Municipal Affairs, R
Minister's Office
Room 306
Parliament Buildings
Victoria, British Columbia V8V
Phone: (604)387-3602 Fax:

GCH / JR

February 19, 1992

File: 14,200

Mr. J.C. Currie
4375 Parkside Crescent
VICTORIA, British Columbia
V8N 2C5

Dear Mr. Currie:

Re: Building Codes and House Construction

Thank you for your letter of December 12, 1991, in which you express your concerns over the direction you feel building codes are taking in Canada.

Your letter raises many points all of which stem from what you say appears to be a "blind pursuit of energy conservation". I agree with you that we should not pursue these or any other goals blindly to the exclusion of all other issues. On this particular subject however, with the continuing depletion of our non-renewable resources being a reality that we all must face, I believe we must look for the balance that conserves our resources while at the same time ensures a healthy and safe living environment. This Government has made a commitment to energy conservation and while we will actively pursue this goal, we will do so while being mindful of the need to balance the scales.

Your second point, which is also related to energy conservation, is the assertion that basic house frame requirements in building codes are, in effect, creating problems by trapping moisture in the framing system. If the results of this will be structural failure as you predict, then there is indeed a problem that needs to be addressed. Your letter indicates to me how seriously you feel about this, and I have therefore requested Ministry staff to investigate this matter at both the provincial and national levels and to advise you of their findings.

It will interest you to know that I intend to assign high priority to creating a separate Code for Housing. The development of such a document, which I hope can begin this year, will be done in an open and fresh manner. This timely project will be an ideal opportunity to review all aspects of house construction including issues such as the ones raised in your letter.

Thank you again for writing. It was very helpful to hear from you directly on these issues.

Yours sincerely,

FEB 19 1992

Robin Blencoe
Minister
JR/cs

#14596/ RB-92-03

File: DL-92-47

Orcs: 155.05 & 280

October 28, 1992

Mr. James C. Currie
4375 Parkside Crescent
VICTORIA, B.C.
V8N 2C5

Dear Sir:

Re: Potential Moisture Problems in Framed Wall Assemblies

I am writing to you regarding your letter of December 12, 1992, addressed to the Honourable Robin Blencoe, Minister of Municipal Affairs, Recreation and Housing, on potential moisture problems in outer wall assemblies.

In your letter you indicated frame wall requirements as mandated by recent building codes are creating conditions that could result in early deterioration of these assemblies due to dry rot. A small task force is investigating this scenario to establish if problems in the field prove your theory. Our interest is confined to problems in dwelling units constructed within the last 6 years as code requirements for the construction of outer wall assemblies have not substantially changed within this period. The buildings should either have experienced dry rot or wall cavity moisture problems or have indications that such conditions could exist.

If you have any record of such occurrences could you please forward copies for inclusion in our investigation.

Yours truly,

Watson J. Smith
Building Standards Officer
Building Standards Branch
(604) 387-4014

WS/cs

8:.8 882-4140 NRC Canadian Codes Centre

National Research Council Canada
Institute for Research in Construction

Conseil national de recherches Canada
Institut de recherche en construction

NRC · CNRC

The Barrett Commission
Inquiry into the Quality of Condominium Construction

Scope, Content and Determination of the National Building Code of Canada and NRC Response to the Currie Letters

G. Adaire Chown, B. Arch.
Senior Technical Advisor
Canadian Codes Centre
Institute for Research in Construction
National Research Council Canada

13 January 2000

Scope, Content and Determination of the National Building Code of Canada and NRC Response to the Currie Letters

Introduction

This presentation is in response to a request from the Barrett Commission to provide information on the scope, content and determination of the National Building Code of Canada (NBC), and on NRC's response to the Currie letters (Appendix A). Unless otherwise noted, references to the Code in this paper are references to the NBC.

Scope

The National Building Code of Canada is a model code whose principal objective is to set out requirements and criteria to provide a minimum acceptable level of health and safety for occupants of buildings across Canada. As a model code, the NBC has no legal status unless adopted or adapted by an authority having jurisdiction. Through adoption and adaptation, it serves as the basis for all building regulation in Canada.

The primary health issues addressed in the NBC include sanitation, indoor air quality, indoor temperature and moisture conditions, and protection from noise and vibration. The safety issues addressed include structural safety, fire safety, safety in the normal use of buildings such as provided by guards and handrails, and to a limited extent, safety during construction and demolition. The NBC also provides requirements that address other issues such as accessibility and protection of buildings from fire.

The NBC does not address energy efficiency. The Model National Energy Code for Buildings and the Model National Energy Code for Houses address energy issues. Like the NBC, the Energy Codes have no legal status unless adopted or adapted by an authority having jurisdiction.

The provision of requirements in the identified subject areas does not mean that the NBC addresses each subject in all possible breadth or depth. For example, although protection from noise is addressed, this is only with respect to air-borne noise; the Code does not address impact noise. For some issues, hundreds of provisions are provided; in others, only a few. Nor do the requirements aim to eliminate all degrees of hazard. Such an effort would result in extremely expensive construction. Rather, the requirements are intended to specify the minimum level of protection needed to provide an acceptable level of health and safety.

Bases for Requirements

Criteria specified in the NBC may be based on empirical evidence or science.

The Code recognizes that the real world is the best test laboratory and that current scientific knowledge cannot necessarily explain in detail the extent to which various mechanisms might be at work in any particular situation. Consequently, many Code provisions describe constructions that have demonstrated effective performance over time – whether or not we understand exactly why.

As we learn more about building performance, the requirements of the Code are up-dated to reflect that understanding. Great care must be taken, however, to ensure that scientific evidence is verifiable. Performance as exhibited by a computer model may not, in of itself, be adequate to support a requirement – or the elimination of one.

The Code as a whole, of course, is written by code users: designers, developers, builders, manufacturers, regulatory officials, owners and managers. It is this community at large that decides what the code should address and what levels of performance should be specified in the requirements.

Changes to the Code may be proposed by any interested party to recognize improved knowledge of design or construction, or demonstrated performance of innovations.

Changes are not made without due consideration of the existing provisions, reasons for the proposed change, and evidence that the solution will be appropriate and effective (see Appendix B).

Proposals are subject to review by one of several Standing Committees. These Committees have representation from all regions of the country and all relevant interests. Participation on the Standing Committees is not limited by geography or financial situation since all members' travel expenses are paid. BC has provided significant input to the development of the Code. With reference to the Standing Committee on Housing and Small Buildings and its membership in the period of the development of the 1980 Code to the present, an average of 18% of the members have represented BC.

Proposals are also submitted to general public review (see Appendix C). This provides an opportunity for all interested persons to participate in the code development process.

In the development of the 1995 NBC, over 1,000 changes were proposed and over 4,000 comments were reviewed by the Standing Committees before any decisions were made.

Within the resources available, staff of the Canadian Codes Centre, and research advisors from the Institute for Research in Construction provide technical information to the Standing Committees to assist them in their deliberations. Information is drawn not only from the Institute but from a wide range of Canadian and international sources.

Contents of the NBC

In addition to the technical requirements addressing the subjects outlined previously, the NBC provides:

- general statements of application
- definitions of words and phrases that have special meaning in the context of the Code
- references to climatic information, and
- requirements for design information and design review to indicate compliance with the technical requirements.

The general statements of application, for example, those that define whether a building is subject to Part 5 Environmental Separation or Part 9 Housing and Small Buildings for building envelope design and construction, are based on building size, height and occupancy and thus reflect in general the structural, environmental, occupancy or fire loads that are likely to be imposed on the building.

Performance and Prescriptive Requirements

In its provision of technical requirements, the NBC contains both prescriptive and performance provisions. Even Part 9, which is generally considered to be prescriptive, provides performance requirements. In the context of discussions on the BC condominium failures, numerous comments on the Code have focussed on the prescriptive requirements. In evaluating the adequacy of the Code in addressing any particular concern, the focus should first be on the performance requirements.

Performance Requirements

Until 1980, building envelope requirements for larger buildings were provided in Part 4. At least as early as 1960, Section 4.7 Cladding, provided performance requirements addressing ingress of precipitation. The provisions that are most familiar were virtually unchanged from the 1965 NBC to the 1990 NBC; these are:

> 4.7.1.4.(1) A junction of components of an exterior surface and a junction of different exterior surfaces of a building shall be constructed to resist the entrance of rain water into the building.
>
> ...

(6) Exterior wall cladding shall be so installed that it sheds water to prevent its entry into other components of the building assembly. Where there is a likelihood of some penetration, drainage shall be provided to take the water back to the outside.[1]

Of note here is the emphasis on protection from ingress, with drainage only as a second line of defence to recognize that absolute prevention of ingress is difficult given construction tolerances and performance of building assemblies over time.

A Code for Dwelling Construction for Buildings Housing One or Two Families, the predecessor to the Residential Standards and Part 9 of the NBC, was published in 1950. That document states that:

97. General

All exterior wall covering shall be applied in such a way that all sheathing and framing beneath is effectively protected from the weather.[2]

Although the application of this Code was such that it would not have applied to the BC condominium projects, it is indicative of a general long-standing understanding of the function of cladding.

Again, the more familiar requirement is currently provided as:

9.27.2.1. Required Cladding

1) Exterior walls shall be protected with cladding, including flashing, trim, and other special purpose accessory pieces required for the cladding system being used, to restrict the entry of rain and snow into the wall assembly.[3]

This provision has remained effectively unchanged since 1975. While the Code requirements related to flashings and sheathing membranes acknowledge that ingress is difficult to prevent, the focus is on controlling ingress of precipitation past the cladding.

It is these performance provisions that state what must be achieved. They must be complied with regardless of whatever other provisions apply. Knowledge of acceptable construction is critical to compliance. The Code does not tell designers, builders, manufacturers or regulators all they need to know to achieve this end. The Code acknowledges the massive amount of information available on building design and construction, and recognizes demonstrated acceptable performance. It does not attempt to serve as a design guide or to describe acceptable construction details.

1 National Building Code of Canada 1965, Associate Committee on the National Building Code, National Research Council Canada, Ottawa, Third Printing 1967.

2 A Code for Dwelling Construction for Buildings Housing One or Two Families, Associate Committee on the National Building Code, National Research Council Canada, Ottawa, 1950.

3 National Building Code of Canada, Canadian Commission on Building and Fire Codes, National Research Council Canada, Ottawa, 1995.

Prescriptive Requirements

Prescriptive requirements state, for some specific materials and components, properties and installations that are consistent with achieving the performance requirements. They are not complete or comprehensive, nor intended to be so.

For simplicity, a set of prescriptive requirements may define a solution that exceeds the required minimum performance in some cases. They are not necessarily finely tuned to loads or functions. In order to ensure that a simple solution will perform in a more demanding situation, it will likely exceed minimum performance levels necessary in less demanding situations.

For example, Sentence 9.29.5.9.(1) specifies that where screws are used to install interior gypsum board on lumber wall studs, the screws must be spaced not more than 300 mm o.c. where the studs are not more than 600 mm o.c., or not more that 400 mm o.c. where the studs are not more than 400 mm o.c. [4] This number and spacing of screws significantly exceeds what is necessary to simply fasten gypsum board to wood framing in a wall. The requirement recognizes, however, that the gypsum board may be serving a variety of functions such as providing lateral support, racking resistance, fire protection, and support for the airtight element of the air barrier system. The Code could specify different fastening requirements depending on the function or functions served by the gypsum board in various situations. For simplicity, however, only one acceptable solution is described which will address all cases.

Conversely, in reflecting adequate or acceptable construction, prescriptive requirements do not necessarily reflect "best" practice. Consequently, the prescriptive requirements may not be consistent with recommendations presented in the literature.

As noted previously, the Code recognizes the vast amount of information available on building design and construction that has demonstrated acceptable performance. The prescriptive requirements do not attempt to duplicate this information.

At the risk of overstating a point, it has been known for at least 150 years that standard stucco applications should only be used on buildings with overhangs. A preeminent US architect, A.J. Downing, stated that:

> ... nothing but attention to a few simple rules is necessary to insure success in stuccoing in this country.
>
> The first of these rules is, not to use stucco except upon buildings with projecting roofs, in order to prevent the possibility of the wall getting saturated at the eaves. [5]

4 National Building Code of Canada, Canadian Commission on Building and Fire Codes, National Research Council Canada, Ottawa, 1995. Section 9.29. Interior Wall and Ceiling Finishes.

5 Downing, A.J. The Architecture of Country Houses, Appleton & Co, New York, 1851.

Whenever a design varies from traditional approaches that have demonstrated acceptable performance, the design must be re-evaluated to ensure that an equivalent level of performance will be provided.

The prescriptive requirements do not limit solutions that might be applied in a particular case. Section 2.5. Equivalents states that:

> **2.5.1.1. Alternative Methods, Appliances, Systems and Equipment Permitted**
>
> 1) The provisions of this Code are not intended to limit the appropriate use of materials, appliances, systems, equipment, methods of design or construction procedures not specifically described herein.
>
> ...
>
> **2.5.1.3. Equivalence Demonstrated by Past Performance, Test or Evaluation**
>
> 1) Materials, appliances, systems, equipment, methods of design or construction procedures not specifically described herein, or which vary from the specific requirements of this Code, are permitted to be used if it can be shown that these alternatives are suitable on the basis of past performance, tests or evaluations. [6]

Such statements have been provided in the NBC since 1970.

NRC Response to the Currie Letters

In addition to specific proposals for changes to the NBC, the Standing Committees also respond to general correspondence. Mr. John Berndt, Deputy Chairman of the Associate Committee on the National Building Code, received correspondence in December 1987 from Mr. Jim Currie, then Director of the BC Building Standards Branch (see Appendix D), and subsequently, in June 1992, Mr. Jim Traynor copied to Mr. Berndt a letter addressed to Mr. Jack Robertson, then Director of the BC Building Standards Branch, referring to correspondence with Mr. Robertson and Mr. Robin Blencoe, Minister of Municipal Affairs, Recreation and Culture, and a letter of 23 December 1991 from Mr. Currie (see Appendix E).

1987 Correspondence

Mr. Currie raised the following concerns in his letter to Mr. Berndt and in the attached paper "Airtight Houses":

1. perceived effects on air- and moisture-tightness of energy conservation requirements in the NBC and consequent jeopardizing of health and structural sufficiency

6 National Building Code of Canada, Canadian Commission on Building and Fire Codes, National Research Council Canada, Ottawa, 1995.

2. perceived acceptance of new low vapour-permeance sheathing materials, such as plywood, without consideration of the overall required performance of the assembly
3. lack of definition of the air barrier system in terms of vapour permeance
4. lack of compliance with the requirement for a maximum 19% moisture content in lumber
5. inadequate ventilation as a consequence of sealing the building envelope and possible entrapment of contaminants such as radon

The following comments are offered:

1. Energy Conservation

As noted previously, the NBC does not address energy conservation. The four provincial building codes that are based on the NBC do address energy conservation and differ from the NBC in this regard. Requirements specifying minimum thermal resistance values for insulation were not introduced into the BC Building Code until December 1992 and then only for houses.

The air barrier system and vapour barrier requirements in the NBC are provided to reduce the probability of excessive accumulation of moisture within the building envelope as a result of outward migration of water vapour from the interior. The vapour barrier addresses water vapour transported by vapour diffusion; the air barrier system addresses water vapour transported by air leakage. Requirements for vapour barriers have been included in the NBC since the first edition in 1941; for example:

> **3.2.16.2 Sheathing.** -
> ...
> **(g) Other Materials.**- ...
> When either sheathing or the building paper is highly resistant to the transmission of water vapour, an effective vapour barrier shall be provided between the interior face of the studs and the exposed interior face of the wall."
> "A vapour barrier is desirable whenever the vapour transfer factor of either the sheathing or the building paper is less than 2.0. Such vapour barrier should have a transfer factor not greater than 0.5. The vapour transfer factor is expressed in gm. per 24 hours per square metre per mm. vapour pressure difference.'

The evolution of the Code to also include explicit requirements for air barrier systems was not in response to the energy crisis of the early 1970s. Rather, in recognition of building envelope failures, these requirements reflected a better understanding by researchers and practitioners that air leakage is the more significant moisture transfer mechanism. Requirements for air barrier systems first appeared in the 1965 Code.

7 National Building Code, National Research Council Canada, Ottawa, 1941. Note that this requirement and the accompanying note are repeated in several contexts.

2. Moisture Entrapment

Mr. Currie correctly identifies the potential for moisture accumulation in wall assemblies where materials installed toward the exterior have low water vapour permeance. The demonstrated effective performance of wood-frame wall assemblies that comply with all requirements of the Code, however, does not support Mr. Currie's concerns. That is, there is no evidence that assemblies with the required air barrier system and vapour barrier are subject to excessive accumulation of moisture transferred from the interior when plywood or waferboard sheathing is installed.

It is notable that, just as the requirements for vapour barriers have been included in the NBC since 1941, plywood was also recognized in the 1941 Code. While the NBC permits materials such as plywood, waferboard and oriented strandboard (OSB) as sheathing materials, it does not require their installation. That is, the assembly recommended by Mr. Currie using shiplap sheathing is also permitted by the Code.

3. Permeance of Materials in the Air Barrier System

As noted previously, the Code assumes an understanding of good construction practice. The Code permits flexibility in the design of building envelope assemblies including the location of the airtight elements of the air barrier system. The vapour permeance of materials in the air barrier system is of concern only where these materials are installed toward the colder side of the assembly. The Code provides no requirements that would preclude installation of these materials on the warm side of the assembly. For clarification, this issue was addressed in any case in the 1990 NBC and additional explanatory information was included in the Appendix to the Code.

4. Moisture Content of Lumber

Mr. Currie raises valid concerns related to lack of compliance with the limit on moisture content of lumber. If climatic and industry conditions are such that wood frame walls must be finished before the moisture content can be reduced to 19%, the Code requires that an alternative construction be used.

5. Ventilation

The issues raised by Mr. Currie with respect to ventilation do not relate to deterioration of the building envelope and are thus not discussed here.

Mr. Currie provides recommendations for what he considers to be an appropriate wood-frame wall construction. Although there is no evidence that such an assembly is required in order to provide an acceptable level of performance, there are no provisions in the Code that would preclude the construction he suggests.

Mr. Currie's correspondence was provided to the Standing Committee on Houses and Small Buildings for its consideration, and was reviewed at the Committee's Thirty-Fifth Meeting, 12 to 14 April 1988. The Minutes record that:

> ... some of Mr. Currie's concerns may be partially satisfied by the proposed revisions to [NBC Section] 9.26. and [Subsection] 9.33.3. and the accompanying appendix notes. .... It was further noted that a fairly leaky house can still be built under existing NBC requirements so that the options suggested presently exist. It was therefore agreed that no action be taken.[8]

(See Appendix F.)

The referenced change to Section 9.26., Section 9.25. in the 1990 and 1995 editions, related to a provision addressing the location of air barrier system materials with low vapour permeance. The changes to Subsection 9.33.3., Subsection 9.32.3. in the 1990 NBC, related to ventilation and do not pertain to the issue of deterioration.

1991 - 1992 Correspondence

The 1991-1992 correspondence largely reiterates the concerns expressed by Mr. Currie in his 1987 letter. This correspondence was forwarded to the Standing Committee on Housing and Small Buildings and was reviewed at its Forty First Meeting, held 16 and 17 November 1992. The Minutes record that:

> The Standing Committee agreed that, given
> - the inventory of buildings constructed according to the Code which do not evidence problems of moisture entrapment
> - the limited amount of technical detail provided by Mr. Traynor on the cases he mentions
> - the requirement to use dry lumber
> - the scope of the Building Code which does not address the building process, and thus any wetting of wood components that may occur during that construction period
>
> it would be difficult, without further documentation of problems with Code-conforming buildings, to recommend any changes to the Code requirements.[9]

(See Appendix G).

In other words, and as described in the Guidelines for Proposing Changes provided in Appendix C, the Standing Committees cannot respond to opinions that are not substantiated by solid technical documentation.

---

8 Minutes of the Thirty-Fifth Meeting of the Standing Committee on Housing and Small Buildings – 12 to 14 April 1988, Ottawa, 1988.

9 Minutes of the Forty First Meeting of the Standing Committee on Housing and Small Buildings – 16 and 17 November 1992, Ottawa, 1992.

Summary

In the context of the review of the premature failures of condominiums in BC, it should be noted that Mr. Currie's concerns focus on the control of moisture transfer from interior space into wall assemblies. All evidence pertaining to the BC condominium failures indicates that the source of moisture that has caused those failures is precipitation entering from the exterior. As noted previously, the NBC, since the beginning, has included requirements to address precipitation ingress. Furthermore, the evidence indicates that the volumes of water that have entered the failed wall assemblies are of such a magnitude that no degree of air or vapour permeance would be adequate to permit dissipation before the onset of deterioration.

Concluding Comments

The National Building Code is a living document written, in effect and in fact, by designers, developers, builders, manufacturers, regulatory officials, owners and managers, for the use of those same interests and all building users in all regions of Canada. Knowledgeable representatives from BC have actively participated in the development of the NBC — an on-going and open process to respond to the needs of building users and the Code-using community, and also to on-going technological development and innovation in design and construction. Had additional provisions been necessary to address particular conditions in BC, proposals would undoubtedly have been brought forward and addressed.

National Research Council Canada
Conseil national de recherches Canada

Institute for Research in Construction
Institut de recherche en construction

NRC - CNRC

TO/Destinataire : Tom Sinclair Barrett Commission	**FAX :** 604-844-1888 **Tel./tél. :**
FROM/Expéditeur : John C. Haysom, P. Eng. Canadian Codes Centre - Centre canadien des codes NRC - CNRC Ottawa, Canada, K1A 0R6	**No. of Pages:** 6 **Nombre de pages:** **Date:** February 7, 2000 **FAX :** (613) 952-4040 **Tel./tél. :** (613) 993-0043

Message:

Mr. Sinclair:

Enclosed are the following:

- Extracts from the two meetings of the Standing Committee on Housing and Small Buildings you are interested in showing the members present and absent. I have put an arrow beside the BC members.
- Extracts from the current membership of the Standing Committee on Houses giving the coordinates of all the BC members indicated in the minute extracts except for Dave Verge, whose coordinates I believe you already have.

DOCUFAX

Associate Committee on the

NATIONAL BUILDING CODE

National Research Council

Canada

MINUTES OF THE THIRTY-FIFTH MEETING OF THE STANDING COMMITTEE ON HOUSING AND SMALL BUILDINGS

Held on 12, 13 and 15 April 1988 in Room 1147 of the Herzberg Institute, 100 Sussex Drive, Ottawa, Ontario.

Members present: [1]

E.I. (Easton) Lexier *(Chairman)*
R.A. (Bob) Etherington
A. (Terry) Hale
K. (Ken) Harris
G. (Guy) Harvey
J.-C. (Jean-Claude) Havard
E.D. (Eric) Jones
O.I. (Oleg) Luciw
B. (Bruno) Nantel
A.W. (Andy) Nytepchuk
V.A. (Vincent) Presseau
W. (Wayne) Purchase
G.D. (George) Shortreed
P.L. (Peter) Southwell
J. (John) Timusk
A.L. (Al) Treppel
G.L. (Gordon) Walt
J.S. (Jim) Yamashita
D.C. (Dave) Verge

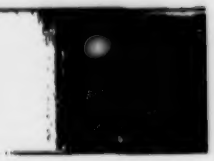
R.P. (Bob) Bowen *(Technical Advisor)*
R.J. (Richard) Desserud *(Technical Advisor)*
L. P. Saint-Martin *(Technical Secretary)*
A. Warnock *(IRC, Acoustics Section)*

Members absent:
A.W. (Bim) McIntyre
W.J. (Will) Phillips

Visitors making a presentation:
H. Vokey, Forintek, Ottawa

Observers:
B. Charest, CGSB, Ottawa
J. Deutekom, CGSB, Ottawa
J. Haysom, Scanada Consultants, Ottawa
R. A. Hewett (IRC, Codes Section)
P. Russell, CMHC, Ottawa

[1] A list of members, showing title and affiliation is included in the Appendix, pages 1 to 3.



Canadian Commission on Building and Fire Codes
National Research Council
Canada

MINUTES OF THE FORTY-FIRST MEETING OF THE STANDING COMMITTEE ON HOUSING AND SMALL BUILDINGS

Held on November 16 and 17, 1992 in the Conference Room, 1st floor, of Building M-20, National Research Council, Montreal Road, Ottawa, Ontario.

MEMBERS PRESENT*

Mr. W. (Wayne) Purchase (Chairman)
Mr. S.T. (Steve) Gertsman
M. J.-C. (Jean-Claude) Havard
Mr. E.D. (Eric) Jones
Mr. L.T. (Lewis) Nakatsui
Mr. K. (Ken) Rauch
Mr. R.J. (Robert) Sloat (1st day)
Mr. J.S. (Jim) Yamashita

Dr. M.B. (Margaret) Ellison
Mr. T.A. (Terry) Hale
M. C. (Claude) Héroux
Mr. O.I (Oleg) Luciw
Mr. A.W. (Andy) Nytepchuk
Mr. G.D. (George) Shortreed
Mr. R. (Richard) Stewart

Ms. G.A. (Adaire) Chown (Technical Advisor)
M. M. (Michel) Lacroix (Technical Secretary)

Mr. J.C. (John) Haysom (Technical Advisor)

MEMBERS ABSENT

Dr. S.A. (Sherif) Barakat (Research Advisor)
Mr. P.E. (Pierre) Dumouchel
M. J.-M. (Jean-Marie) Rousseau
Mr. D.C. (David) Verge

Mr. J.E. (Edward) Burns
Mr. G. (Gary) Proskiw
Mr. J. (John) Timusk

* A complete list of the membership of the Standing Committee showing title and affiliation is attached as Appendix A.

FAX

Ministry of Social Development and Economic Security
Building Policy Section
6 th Floor, 800 Johnson Street, Victoria, B.C. V8V 1X4
Fax 387-5120

Robyn

We are transmitting 3 page(s) including cover sheet.

TO:	Tom Sinclair, Barrett Commission
	(604) 844-1888
	DATE: Dec. 6, 1999
	FROM: NAME: Lyle Kuhnert
	(Telephone) 387-9182

RECEIVED
DEC 07 1999
MINISTRY OF ATTORNEY GENERAL

URGENT:	CONFIDENTIAL:	CONFIRM RECEIPT:

Good afternoon Tom

Attached is list of BC's representation on Part 9, Part 5 NRC Standing Committees
Please call if you need further clarrification or info.

Cheers
Lyle

Haysom, John, 03:39 PM 12/6/1999 -0500, RE: intent statements, standing committee membership

Date: Mon, 06 Dec 1999 15:39:37 -0500
From: "Haysom, John" <John.Haysom@nrc.ca>
Subject: RE: intent statements, standing committee memberships
To: '"Lyle Kuhnert" <lkuhnert@hq.marh.gov.bc.ca>
X-Mailer: Internet Mail Service (5.5.2448.0)

Hi Lyle:

Intent analyses are on their way by FAX. I assumed you have the same FAX number as Bob.

Current BC members on Standing Committee on Environmental Separation:

Mr. G. F. Johnson
Senior Technical Advisor
Project Development Group
British Columbia Buildings Corporation
3350 Douglas Street
Victoria, BC
V8Z 3L1
250-952-8635

Mr. D. C. Verge
President
Verge & Assoicates Consultants
101 - 1470 Pennyfarthing Lane
Vancouver, British Columbia
V7J 4Y2
604-732-7879

Mr. D. L. Watts, P. Eng., MAIBC, MRAIC
Building Envelope Specialist
City of Vancouver
Community Services
City Hall
453 W 12th Avenue
Vancouver, British Columbia
V5Y 1V4
604-871-6051

Current BC members on Standing Committee on Houses:

Mr. S. T. Gertsman, P. Eng.
Building Technology & Code Consultant
Sheltertech Services Inc.
6000 Barnard Drive, Unit 29
Richmond, British Columbia
V7C 5P7
604-313-8291

Haysom, John, 03:39 PM 12/6/1999 -0500, RE: Intent statements, standing committee membership

Mr. T. A. Hale
T. Hale Architect Cororation
1397 Riverside Drive
North Vancouver, British Columbia
V7H 1V6
604-929-1325

Dr. Y. H. Chui, PhD., P. Eng. FIWSc
Forintek Canada Corp.
2665 East Mall
Vancouver, British Columbia
V6T 1W5

Mr. R. Maling
Director of Licensing and Registrar
Homeowner Protection Office
P.O. Box 11132 Royal Centre
Suite 2270 – 1055 West Georgia Street
Vancouver, British Columbia
V6E 3P3
604-646-7067

Mr. R. Stewart
Stewart Communications
222 Sorento Drive
Coquitlam, British Columbia
V3K 6H6
604-729-0097

John C. Haysom, P. Eng.
Unit Head, Buildings & Services
Canadian Codes Centre
Institute for Research in Construction
National Research Council
telephone: 613-993-0043
fax: 613-952-4040
email: john.haysom@nrc.ca <mailto:john.haysom@nrc.ca>

——Original Message——
From: Lyle Kuhnert [mailto:lkuhnert@hq.marh.gov.bc.ca]
Sent: Monday, December 06, 1999 2:16 PM
To: John.Haysom@nrc.ca
Subject: intent statements, standing committee memberships

Hello John,

THE BARRETT COMMISSION

INQUIRY INTO THE QUALITY OF CONDOMINIUM CONSTRUCTION

David Barrett, Commissioner

October 13, 1999

Mr. David Dodge
Deputy Minister of Health
Health Canada
1526-B 15th Floor
Brook Claxton Building
Tunney's Pasture ON15-B
Ottawa, Ontario
K1A 0K9
Fax – 613-952-8422

Dear Mr. Dodge,

On August 11, 1999 the Honourable Moe Sihota, Minister of Social Development and Economic Security, announced the reconvening of the Commission of Inquiry into the Quality of Condominium Construction. The terms of reference for the Commission's work are:

1. To further inquire into the quality of condominium construction in British Columbia, in particular, the adequacy of protection for, and accountability to, consumers for faulty condominium construction.

2. To inquire into the impacts on homeowners, the housing market, mortgage insurers and the economy of the financial failure of New Home Warranty of British Columbia Inc., and to inquire into the history of home warranties in BC and the causes of the failure of New Home Warranty of British Columbia Inc.

3. To inquire into the extent of foreclosures, bankruptcies and related matters arising from faulty condominium construction.

4. To submit a report by January 15, 2000 to the Lieutenant Governor in Council, through the Minister of Social Development and Economic Security, recommending any measures, including, but not limited to, changes to legislation, regulations or administrative practice, that the Commissioner determines are needed.

The Commission began its hearings September 13, 1999, and we would appreciate it if Health Canada would attend to make a presentation to the Commission and be prepared to answer questions. The main reason we are requesting Health Canada's attendance at the hearings is that it has been brought to our attention that there are air quality and health risk concerns due to rotting buildings.

We are interested to learn what research Health Canada may have undertaken respecting these risks and impacts on residents. Also, has Health Canada adopted any policies or procedures as a result of such analysis?

Please call Ms. Dixie Pidgeon, Executive Assistant to the Commissioner, at 844-1886 (or fax at 844-1888) by October 18, 1999, to confirm your participation. A specific time and date for your appearance will be confirmed during the week following.

Thank you in advance for your co-operation.

Sincerely,

David Barrett
Commissioner

Suite 629 - 999 Canada Place
Vancouver, British Columbia V6C 3E1
Phone (604) 844-1886 Fax (604) 844-1888
E-mail:leaky.condo@gems7.gov.bc.ca

Health Canada / Santé Canada
Deputy Minister / Sous-ministre
Ottawa, Canada
K1A 0K9

Your file / Votre référence
Our file / Notre référence

NOV - 8 1999

Mr. David Barrett
Commissioner
The Barrett Commission
629 - 999 Canada Place
Vancouver, British Columbia
V6C 3E1

Dear Mr. Barrett:

Thank you for your letter of October 13, 1999, requesting an appearance by Health Canada researchers before the Barrett Commission – Inquiry into the Quality of Condominium Construction.

Over the last several years, Health Canada has maintained a formal working and collaborative relationship with several professionals active in this area. This involves specific work on the health effects of fungus and moulds with Dr. Robert Dales, a clinician who has been conducting research in this and related areas, and most recently with Dr. David Miller, an academic well known for his work in this field.

Dr. Dales has been with us in a part-time capacity for some years, and would have useful input for your Commission. However, as a full-time clinician, his time is not entirely ours to command, and we would have to work out a mutually agreeable time for an appearance before the Commission. Dr. Miller is primarily an academic (Carleton University), and any input he might have would best be presented in his capacity as an independent researcher in the area of indoor moulds.

With respect to policies and procedures on this issue, Mr. Will Robertson, Product Safety Bureau, Health Protection Branch, was a member of the committee and author of the Health Canada reports on procedures

.../2

Canada

to assess and deal with moulds and associated health issues in public buildings. His input would be useful from this perspective.

While we are agreeable to Dr. Dales and Mr. Robertson providing their input and expertise to your Commission, their professional situations and busy agendas will necessitate finding a mutually agreeable time for their appearance. Dr. Dales can be reached by telephone at (613) 957-1886, and Mr. Robertson at (613) 957-1505.

Once again, thank you for writing.

Yours sincerely,

David A. Dodge

THE BARRETT COMMISSION

INQUIRY INTO THE QUALITY OF CONDOMINIUM CONSTRUCTION

David Barrett, Commissioner

BY FAX TRANSMISSION (613-952-8422)

December 3, 1999

Mr. David Dodge
Deputy Minister of Health
Health Canada
1526-B 15th fl, Brook Claxton Bldg
Tunney's Pasture ON15-B
Ottawa, ON K1A 0K9

Dear Mr. Dodge:

Re: Health Canada Co-operation

Thank you for your letter dated November 8, 1999, in reply to our request for an appearance by representatives of Health Canada before our Commission. Your reply indicated a willingness to co-operate with our work, and you suggested three individuals who might be of help, although only one of them actually works directly for Health Canada, Mr. Will Robertson of the Product Safety Bureau. I wish to advise you that Mr. Robertson is not returning our telephone calls.

A member of my staff contacted Mr. Robertson on Monday, November 22nd. Mr. Woods was surprised to hear Mr. Robertson say that he had not seen your letter of November 8th. Consequently, it was agreed that Mr. Woods would send him a copy of both our initial letter to you, and your reply - and that Mr. Robertson would contact Mr. Woods to discuss an appearance before the Commission. Since that time, Mr. Woods has not heard from Mr. Robertson. If Mr. Robertson is unable or unwilling to help the Commission, I would urge you to suggest an alternative representative.

I am sure you share my concern that individuals living in leaky condominiums, that have encountered serious mold problems, have good reason to know more about any health consequences related to their circumstances. In presentations made to the Commission, questions have been raised about health consequences that warrant expert comment.

Sincerely,
Barrett Commission

Dave Barrett (per: MS).
Dave Barrett
Commissioner

Suite 530 - 999 Canada Place
Vancouver, British Columbia V6C 3E1
Phone (604) 844-1886 Fax (604) 844-1888
E-mail: leaky.condos@gems4.gov.bc.ca

THE BARRETT COMMISSION

COPY

File

INQUIRY INTO THE QUALITY OF
CONDOMINIUM CONSTRUCTION

David Barrett, Commissioner

December 10, 1999

The Honourable Allan Rock
Minister of Health
House of Commons
Room 256 – Confederation Building
Ottawa, ON K1A 0A6

Dear Mr. Minister:

Re: Barrett Commission of Inquiry Into The Quality of Condominium Construction

Over the past few weeks this Commission has written several letters to senior members of your Ministry asking for their expert assistance in our work. Copies of such correspondence are enclosed. Regrettably, none of these letters have been answered and telephone phone calls from our commission staff to your department have gone unanswered.

Your department has already publicly acknowledged that mold is a problem by its action on a number of BC First Nations' reserves. The Commission finds it difficult to understand the lack of co-operation we are experiencing from your department in dealing with this issue relative to leaky condominiums in British Columbia.

Professor Chris Van Netten of the University of British Columbia's Health Care and Epidemiology Department, presented some disturbing testimony to our Commission on December 7, 1999, a transcript of same is attached. We would appreciate your assistance in our work by designating a suitably senior representative of your Ministry to appear before the Commission to respond to the important health issues raised by Dr. Van Netten.

Regards,

Dave Barrett
Commissioner

Encl's (3)

Suite 530 - 999 Canada Place
Vancouver, British Columbia V6C 3E1
Phone (604) 844-1886 Fax (604) 844-1888
E-mail: leaky.condos@gems4.gov.bc.ca

THE BARRETT COMMISSION

INQUIRY INTO THE QUALITY OF CONDOMINIUM CONSTRUCTION

David Barrett, Commissioner

Mr. Peter Smith
Chairman
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa Ontario
K1A 0P7

November 9, 1999

Dear Mr. Smith

The Commission of Inquiry into the Quality of Condominium Construction in British Columbia was reinstated by the Provincial Government on August 11, 1999. The terms of reference for the Commission's work are:

1. To further inquire into the quality of condominium construction in British Columbia, in particular, the adequacy of protection for, and accountability to, consumers for faulty condominium construction.

2. To inquire into the impacts on homeowners, the housing market, mortgage insurers and the economy of the financial failure of New Home Warranty of British Columbia, Inc., and to inquire into the history of home warranties in BC and the causes of the failure of New Home Warranty of British Columbia Inc.

3. To inquire into the extent of foreclosures, bankruptcies and related matters arising from faulty condominium construction.

4. To submit a report by January 15, 2000 to the Lieutenant Governor in Council through the Minister of Social Development and Economic Security, recommending any measures, including but not limited to changes to legislation, regulations or administrative practice, that the Commissioner determines are needed.

Suite 629 - 999 Canada Place
Vancouver, British Columbia V6C 3E1
Phone (604) 844-1886 Fax (604) 844-1888
E-mail: leaky.condos@gems4.gov.bc.ca

Mr. Jim Lynch, Regional Director of CMHC for British Columbia made an excellent presentation to the Barrett Commission and answered a number of questions on a wide range of issues on November 3, 1999. As well, CMHC has been very helpful in providing information and answering ongoing questions both throughout these hearings as well as during the first Barrett Commission.

However, the Commission has other questions which relate to CMHC corporate policy and governance, and it is within that context that we would request you and your President and Chief Executive Officer, Mr. Marc Rochon, attend the Commission's hearings.

It would be appreciated if you could confirm your attendance at one of the Commission's hearings prior to December 15, 1999. Dixie Pidgeon, Executive Assistant to the Commission will be contacting your office early next week to confirm a convenient date and time.

Sincerely,

Dave Barrett
Commissioner

CMHC SCHL

Tom

Office of the Chairman of the Board
Bureau du Président du Conseil

November 23, 1999

RECEIVED
NOV 26 1999
MINISTRY OF ATTORNEY GENERAL

Mr. David Barrett
Commissioner
The Barrett Commission
Suite 629 - 999 Canada Place
Vancouver, British Columbia
V6C 3E1

Dear Mr. Barrett:

Thank you for your letter of November 9, 1999, in which you invite me and Mr. Marc Rochon, President and Chief Executive Officer of Canada Mortgage and Housing Corporation (CMHC), to attend the Barrett Commission's hearings into the construction of condominiums in British Columbia.

As you are aware, CMHC's most senior executive in British Columbia, and the person most familiar with CMHC's corporate knowledge concerning the issues your Commission of Inquiry are addressing, Mr. Jim Lynch, General Manager for British Columbia and Yukon, has already attended hearings of the first and second Commissions. Mr. Lynch's presentations and responses concerning these issues reflect CMHC's position from both an operational and policy perspective. Therefore, both Mr. Rochon and I must respectfully decline your invitation to attend before the Commission. However, if CMHC can be of further assistance to the Commission in its inquiries, CMHC will be pleased to continue to co-operate through the offices of Mr. Lynch.

Yours sincerely,

Peter R. Smith
Chairman